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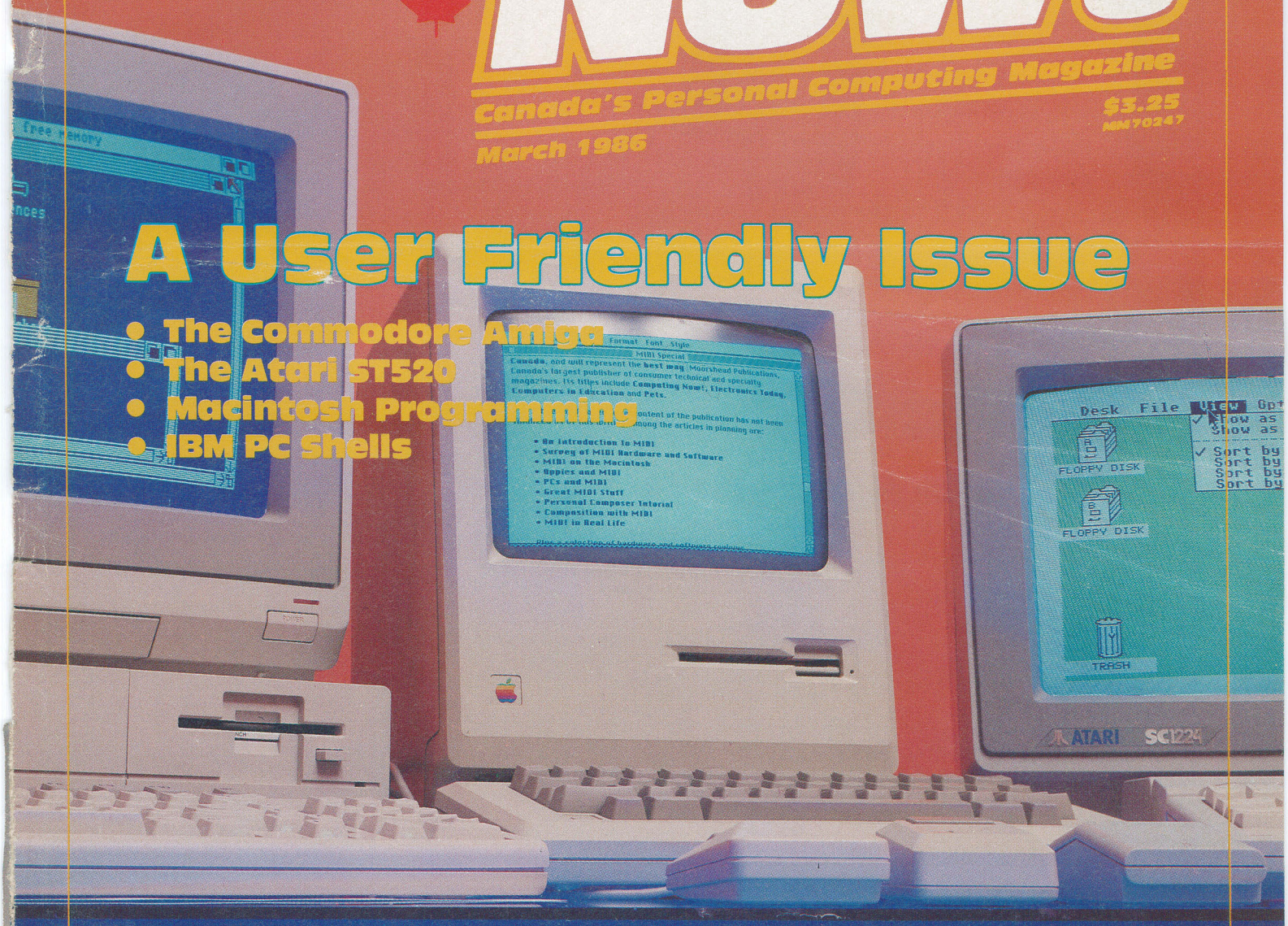

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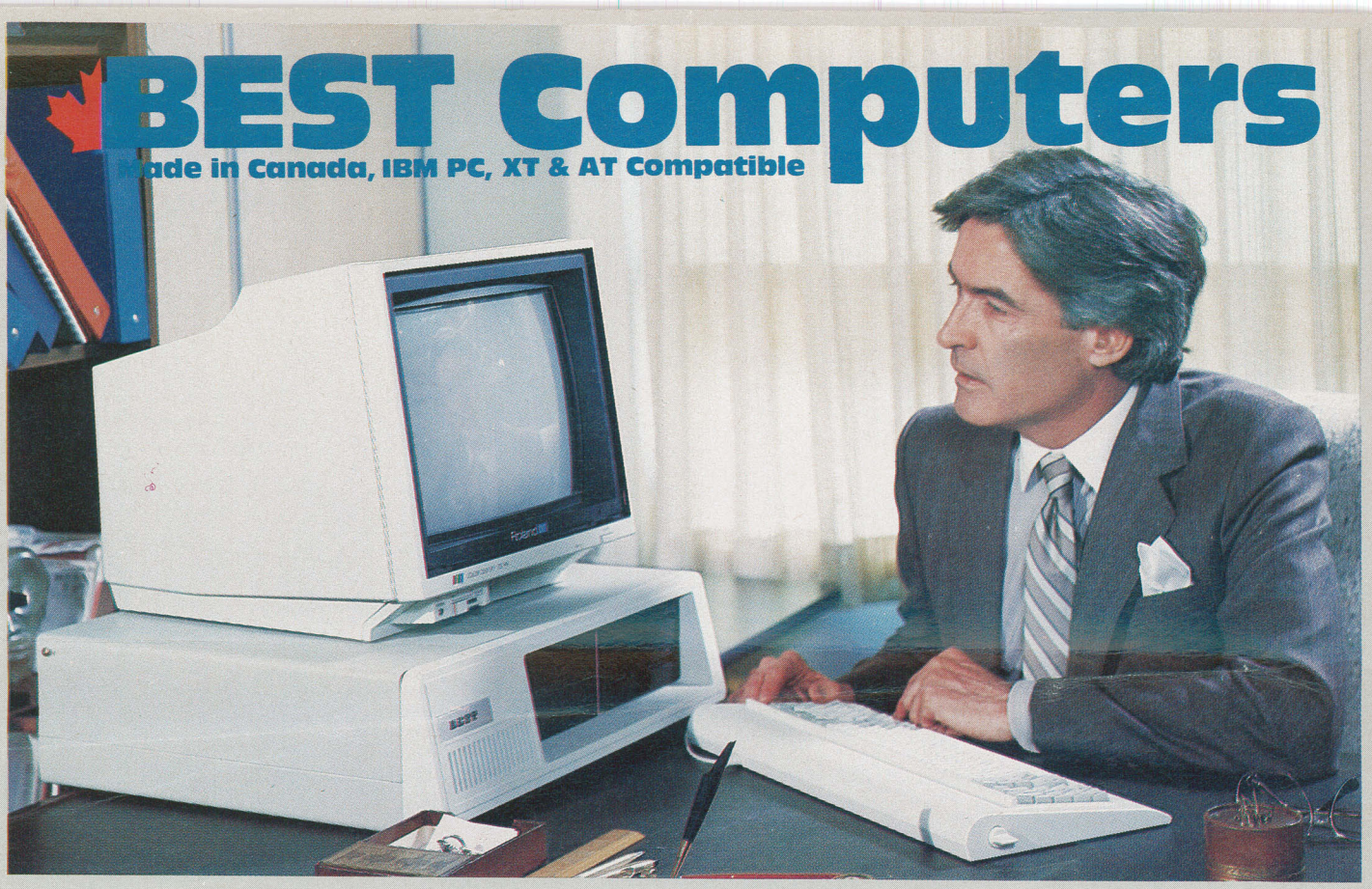

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In Search of the Amiga's Power Switch

If you really think you've experienced everything microcomputers can do to your soul you obviously haven't been close to an Amiga. This almost mythical computer... yes, they really *do* exist... is probably the most interesting thing anyone's done with a soldering iron in the last two years.

by Steve Rimmer

Actually, it only took several seconds to find the Amiga's power switch... it's on the side of the Amiga's case. The mouse connector took a little longer... on the other side, as it turned out... and the monitor jack required a trip to the manual. When all else fails, read the manual.

With all the boxes unpacked... and a reasonable understanding of the minds of the trolls that design computers... the whole system can be plugged together in less time than it takes to boot it. There are relatively few pieces involved. One can initially ignore the extra floppy and the memory expansion box that plugs in under the front panel if one is in a gasping, frantic hurry. However, even if one lingers over these extra bits the whole enterprise takes mere instants.

The Amiga is the first computer in a long time that's really worth rushing through the initial assembly to get booted. A fully loaded Amiga and a suitably well chosen box of disks is easily enough to keep one gaping at the screen for several hours at the very least. While it has its peculiarities... and a startling similarity to... ahem... another system... it slips my mind just now... it is a rippingly powerful box and possibly the first computer ever designed primarily for fooling around with.

Kick In The Slots

Okay, now... let's see. The disks are the by now usual three and a quarter inch deals that one finds in Macintoshes. Remember those Macintoshes... there are more similarities to come. The Amiga's drives and general disk karma have several notable differences from those of the Mac, however. They hold twice as much, with about eight hundred kilobytes of useful space. They come replete with manual eject buttons, so one need not use a paper clip to pop out an errant floppy. The other side of this, however, is that the computer has no electrical way of spitting out its disks, as does the Mac.

Finally, the Amiga's disks are somewhat faster than those of the Mac... things boot more rapidly. Well, applications boot more rapidly. The computer itself is another bucket of snails.

When one first turns on an Amiga the system yawns and stretches for a while and eventually draws a picture of a hand holding a disk that says

Kick
Start

Oh, a pox on the fates... I got a fried Amiga. The picture tube's upside down. Popping in the disk marked KickStart, it thinks for a while, and then asks for

Work Bench

Perhaps if I turned the monitor over. No, wait, there's a boot message... a right side up one... and it's looking promising. Only the initial two graphics are inverted. Most peculiar this. After a suitable wait, the operating system seems to get going and draws an icon in the upper right hand corner. A cursor arrow turns up on the tube... the screen is blue with white type, but, as I eventually discovered, this can be changed... and all life seems to stop.

This looks a lot like a Macintosh. The style of the screen is mostly the same, the icons are similar and the mouse and all that paraphernalia is pretty familiar. The colour is a bit nicer to look at, and everything seems to come down with a bit more of a spring in its step. Everything, that is, except for the initial boot, which occupies almost two whole minutes... an eternity in computer time... and requires up to three manual disk swaps. The guy at Commodore admitted that this was a mild drag, but felt that as one would normally only have to do it once a day it didn't seem too onerous.

There are two buttons on the Amiga's rodent, which is rather in excess of allotment of the Mac's rat. As it turns out, the left one behaves in the normal way, selecting things and moving one's cursor around in applications, with the right one serving to turn on the menu bar and select things from the pull down menu.

Clicking the WorkBench icon we find... yes, it's a window. It looks just like a Mac window... predictably... but it has to think a while before showing one the file icons associated with it. In fact, every time one cracks open a window the thing has to go for its disk. A drag this... the little snooze icon that indicates that the system is busy gets a lot of exercise in the windows.

The general demeanor of the Amiga's operating system... 'scuse me, the "user interface"... is quite manageable. It *is* very much like that of the Mac, but then, the Mac's is quite a bit like that of the Xerox Star. There are surprisingly few operational differences between them. The guy at Commodore said that Commodore haven't been hassled by Apple over it... interesting, as Apple seems to spend almost as much time taking legal action over their computers as they do designing them.

The Amiga can be run into a standard colour television set or the RGB colour monitor it is designed to have atop it. Plugged into a regular tube it looks pretty ghastly... a sort of hyperactive Commodore 64. Graced with its monitor it has fantastic resolution, luminous colours and is a generally superb visual experience. One of the early observations that comes upon one in checking out the Amiga is that if you insist on buying it as the "two thousand dollar computer" that its ads refer to you won't have very much fun with it.

In fact, by the time you add the rest of its optional necessities, a second quarter megabyte of RAM and a second... external... floppy disk, the Amiga costs about twice this much. However, this is a real Amiga. Lesser configurations are frustrating at best.

The phenomena of the Amiga's desk top metaphor are functionally identical to those of the Mac. Someone just went at them with a thesaurus. As such, the Mac's folders are the Amiga's drawers. The Mac's dialogs are the Amiga's gadgets, and so on. The pictures that are associated with these names make about equal sense under either system. The Amiga's graphics are nominally less engaging than those of the Mac... its notably increased speed more than makes up for this.

Among the useful icons that one might want to click in the WorkBench window is something called "preferences". This is equivalent to the Macintosh's control panel,

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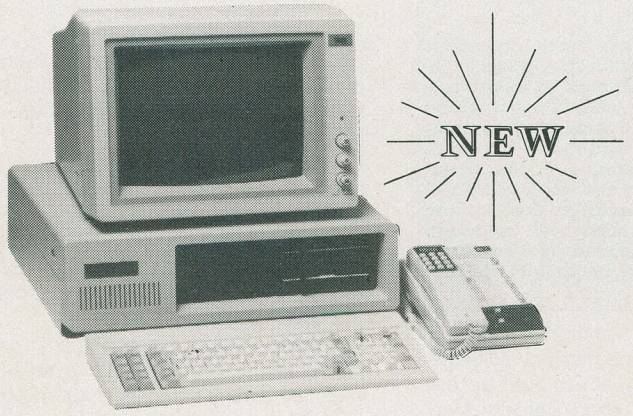

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allowing one to set things like the serial port baud rate and the system colours. In mousing about with this latter adjustment I first began to grok the amazing graphic potential of the Amiga.

The colour adjustment consists of three horizontal bars, one each of the red, green and blue colours that are combined to make video images for the Amiga. The thing that is so awesome about this is that one can adjust the levels of each of these colours to whatever one wants... there are over four thousand actual gradations of colour available to Amiga programs... to create virtually any colour a television set can generate.
luminance of the colours... how bright they are.

When one gets into actual graphics on the Amiga, as some of the demo programs that come with the system generate, one can look at pictures and really have to squint to realize that they're digital, and not simply pictures from a video camera. The graphics of the Amiga transcend a technology as primitive as mere words.

In contrast with the high technology of the system's graphics, there is an icon in the WorkBench which harkens back to things much less sophisticated, this being the CLI, or "command line interface". One of the things that's thunderously frustrating about the Macintosh and its user friendly environment is that it insists on being hospitable, blowing its icons all over the tube, even when one doesn't really want to see them. As such, the Mac's operating system is quite tedious when one is in a hurry.

The Amiga gives one a choice. Opening up a CLI window sends all the icons to never never land, allowing the system to accept commands typed at it in a sort of UNIX like, MS-DOS like structure. This is a well thought out wrinkle, and one which I've often seethed over the lack of in the Mac.

Essentially, one can do the same stuff from either the graphic desktop or the CLI... one can, however, chose between clicking and typing on the Amiga.

There are also utilities available under the system to do things like edit the icons, copy and format disks and do general housekeeping. These functions are pretty straight up, and don't really call for much pondering.

Perhaps the most powerful thing that the Amiga's operating system includes is inherent multitasking. While the Mac has sort of had limited multitasking capabilities added to it in the form of the Switcher, and the PC is frequently beset with third party attempts at it, the Amiga comes upon it naturally. Assuming that one starts with the WorkBench and boots an application from it, the WorkBench exists... conceptually... behind the application. Mouse up to the top of the application's window, pull it down and the WorkBench will be accessible again. You can thereupon boot a second application and alternate between them. The system supports up to four concurrent programs running at once. While I didn't have all that much software to try this with, it seemed to work flawlessly.

I Think Icon, I Know Icon

One of the things that came upon me when I booted the Amiga, got past the KickStart and the WorkBench and the other poorly conjoined jargon of computers that floats around in it, is the lack of software that one has to play with. The standard allotment of disks... aside from the operating system, which isn't all that much fun by itself... includes AmigaTutor, which is interesting but ultimately functionless, MicroSoft's AmigaBASIC, about the only practical thing in the package, and a pretty kaleidoscope demo program from MindScape.

This is one area in which the Macintosh is a decidedly better trip than is the Amiga. The Mac comes with MacWrite and MacPaint... arguably its two most powerful and universally applicable packages... thrown into the deal. The attitude of Apple in this case, that having bought a four thousand dollar system they'll throw in a few hundred bucks worth of software to make it do something, seems a bit more reasonable than Commodore's insisting that one buy virtually everything that one wants to use on the Amiga with the exception of BASIC.

Programming The Amiga

One of the things that's most impressive about the attitudes behind the Amiga is the willingness of its designers to assist programmers in writing code for it. Along these lines several development systems have appeared for it, and there is a set of easily available reference books about concerning its guts. In the next edition of Computing Now! we plan to look at the union of a series of superb C language development tools released by Lattice for the Amiga and a set of books for it by Addison-Wesley.

While the guy at Commodore showed me some absolutely magnificent software for the system, stuff certain to light up the synapses of any brain... even clinically dead ones... I can't say much about it. All I got to try were the standard demos, which, as is usually the case with demos, are pretty good at showing one what the system can do, but not what one can do with it.

The attitude of the guy at Commodore about the Amiga's software, on the other hand, seemed pointedly enlightened. He had a lot more than demos, including some spectacular music and paint programs for the system. What he lacked were the usual business applications, such as spreadsheets and data base managers. In fact, no one I've talked to about the Amiga seemed all that interested in serious business things. A system with the artistic potentials of the Amiga just doesn't seem to have the karma for middle management statistical mumbly peg. In fact, there are a number of reputedly powerful applications in these areas available for the Amiga... but no one seems to care.

The one real application that the Amiga comes with is its MicroSoft BASIC implementation. One might contrast this with the Mac, which lacked any programming languages available for general consumption at its birth. The Amiga's BASIC is actually a mild variation on Microsoft's Macintosh BASIC, easily the most enjoyable programming environment anyone's ever devised for a microcomputer.

As with the Macintosh's BASIC, the Amiga version of the language functions without line numbers. Text is entered into it with a word processor like editor. Lines which must be referenced, such as the beginning of subroutines or the targets of GOTOs, are bedecked with labels, as is the case with most other programming languages. One can insert and delete lines from the text buffer as one develops a program.

The editor includes most of the Macintosh's text manipulation facilities. There's the traditional menu bar at the top of the screen, allowing one to cut, copy and paste text, flip between the editing window and the output screen, save, load, run, suspend and trace programs and so on.

The BASIC is seethingly powerful, with all the usual stuff plus complete control of the Amiga's substantial graphics capabilities and its four channel digital sound generator. There's also built in animation, easily an article in itself to explain. Depending upon what one is writing, the Amiga's BASIC appears to be considerably faster than that of the Macintosh.

In case you were wondering how a line number-less BASIC handles errors, the Amiga's version stops executing one's program, scrolls the screen down to the offending line, prints an error message at the top of the screen and draws a box around the line that's responsible for it.

While it takes some getting used to if you're used to more traditional implementations, the Amiga's BASIC is a party to write with. It's beautifully thought out and gives one a handle on much of what the system can get together.

At The Core

While it has a few weirdnesses about it, and a few things that one might want changed, the Amiga is a superb box. Its hardware facilities in the areas that are really interesting... graphics, sound, I/O and so on... are up there on the leading edge and, in fairness, can pretty well laugh at the those of the Macintosh. At the time of this writing there wasn't a whole lot of software available for it, but, then, it has really only been roam-

ing the planet for a few months.

Admittedly, with orphaned computers being useful only as plant stands I might be inclined to see how this shapes up before laying down four grand for an Amiga.

The only area in which I think the Mac is decidedly preferable to the Amiga is in its construction. While the Amiga is not badly put together, there is an aura of substance about the Macintosh that's lacking in it. Its keyboard is light and doesn't feel like the user interface of a four thousand dollar system. The drives are a bit noisy... mine kept clicking intermittently. In fairness, the mouse is pretty good, and worked a great deal more reliably than most of the really expensive mice I've encountered for the IBM PC.

Most of the interesting applications for the Amiga, of course, use the mouse quite a bit and the keyboard only when all else fails. I think I have a much more profound regard for words than clicks... what can I say... it's my job... and, as such, probably resent less than great keyboards more than most users would.

The question which one should ask about the Amiga is not so much whether it's well executed... it is... but, rather, whether it's good for anything one wants to do. While it has unquestionable power in the areas which microcomputers have come to be regarded as being traditionally useful, it certainly doesn't expend everything it's got in them. Both because of a current software vacuum and because it's much more capable at other things, the Amiga probably isn't a great system for simple word processing, financial or data management or other tasks. I'd still lean toward the unadorned power of a straight up PC for such things.

Another consideration in this area is that a hard drive for the system, by now a standard element of a business computer, costs well over twice what it would for a PC.

The guy at Commodore seemed to feel that the Amiga is a creative computer, an artist's tool rather than a businessman's. I think I'd agree. It is probably one of the most interesting personal systems I've ever encountered, although its price probably serves to make it inaccessible to most individuals who just want to have fun with it.

It is a bit difficult to quickly identify a large group of people who *are* ideally suited to use Amigas, although the sales of the system are reputedly pretty decent. Perhaps it appeals to the individualists, who don't really make it into anyone's demographics.

Unlike many of the other systems I've checked out recently, the Amiga seems like it deserves to be successful. Despite its campaign of truly offensive advertisements, the machine itself really is user friendly and genuinely fun. It's powerful, well thought out and seems to have captured the interest of third party software suppliers.

Hell of a power switch they've got there.

The guy at Commodore was played by Tony Palombo to whom I'm eternally indebted for help and a new WorkBench disk when mine snuffed it. Okay, maybe not eternally, but 'til Tuesday at least.

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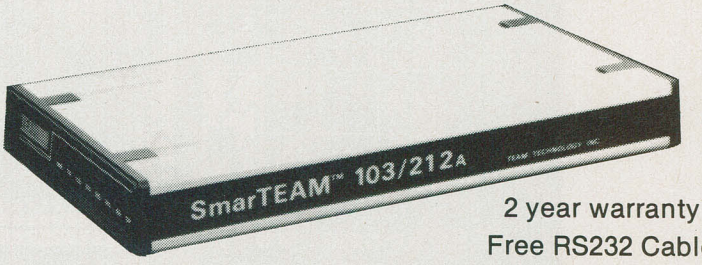

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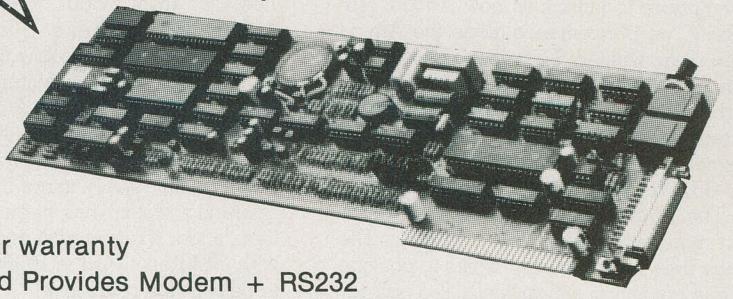

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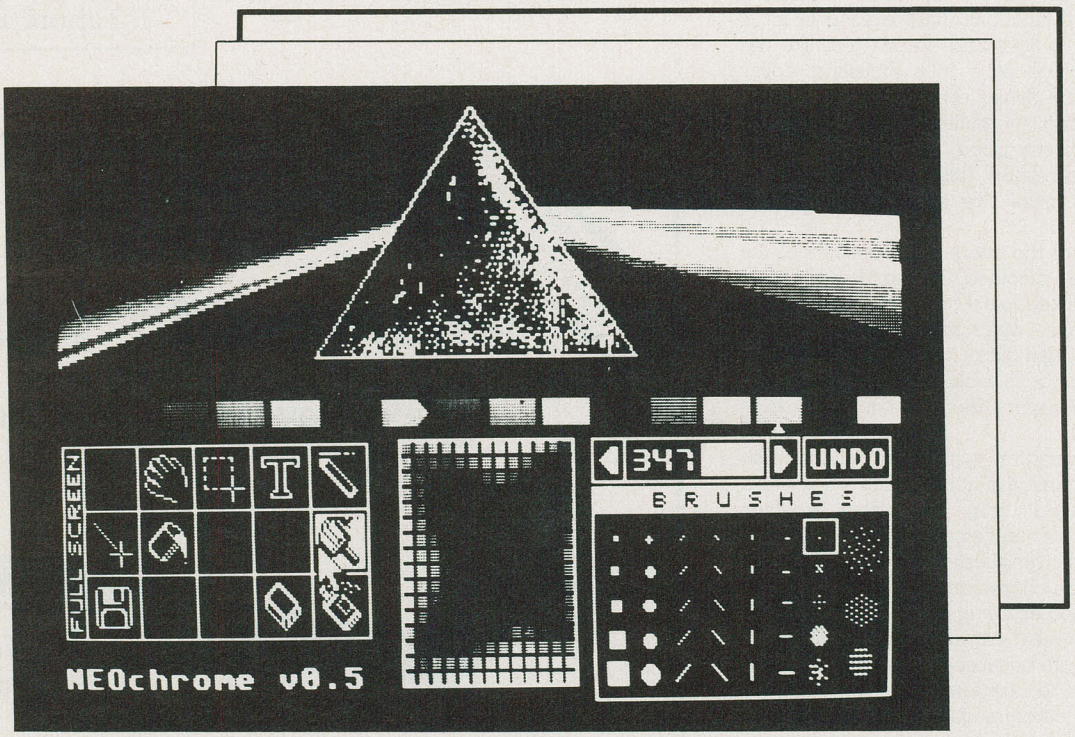
The Atari ST 520

The new Atari 520 ST may very well be a dark horse of a different colour in the 68000 sweepstakes.

by Frank Lenk



The Atari 520 ST has been something of a well kept secret. When it was first introduced, the ST was all but swept away in the whirlwind media blitz used by Commodore to launch its new Amiga. Admittedly, on performance alone the Amiga is the clear winner. This does not stop the Atari from being one heck of a power ful machine. Judged on all factors... market related as well as technical... the Atari may be emerging as the dark horse winner in the new 68000 sweepstakes.

The Atari's weaknesses are starting to look more and more like strengths. The Amiga uses several custom chips to provide top end animation capability. It also opts for an entirely custom multitasking operating system. The Atari, on the other hand, emulates a philosophy I first heard expounded by Adam Osborne. Osborne brought the cost of CP/M business systems down drastically by creating his portable Osborne I strictly from "off the shelf" technology. Not only is the off the shelf approach cheaper, it's also more reliable.

The Atari went with the relatively conservative GEM environment, from Digital Research. The internal chip set is based largely cn standard 68000 doctrine. The actual disk operating system, TOS, was designed by Digital Research and cribbed heavily from both CP/M 68K and MS-DOS. These unremarkable technologies did not allow the Atari to rival all of the Amiga's features. They did, however, ensure that the Atari worked right the first time, and at the right price. The ST made its debut *sans* software, but pretty much on time. Only minor fine tuning of the operating system has been required since then, and it is reported at press time that STs with GEM and TOS in ROM are starting to appear at the retail level.

The Atari's pricing may be working against it to some degree, simply because it is not quite believable. For about fifteen hundred dollars... Canadian... you can have a 68000 based computer with a half megabyte of RAM, plus one 400K micro floppy disk drive and a truly superb colour monitor. The monochrome version is about two hundred dollars cheaper.

This kind of pricing has made the Atari a quiet hit, worldwide. Two month waiting lists are reportedly the rule in Europe, making the ST one of the hottest machines on the other side of the big pond. Canadian supplies have apparently been tightening up as well.

Programmers seem to be taking to the ST at an incredible rate. This may be partly due to the machine's cost effective price, or it may simply reflect a widespread desire to get into 68000 machine code... or maybe both. Whatever the reason, the Atari now has available a respectable library of software, including spreadsheets, databases, games, and of course graphics programs. In fact, Atari and its dealers are bundling the machine with a very comprehensive selection of software. Depending on where you go and what's in stock, most buyers should end up with: TOS, BASIC, LOGO, DB Master One, 1st Word, Megaroids, and Neochrome. We'll get into what they all do in just a moment.

Getting Physical

As hardware, the Atari ST is not going to win any prizes. Following its usual philo-

sophy, Atari has built the ST as one of those unitized keyboard computers, much like the... gasp... Commodore 64, or Atari's own 800 series eight bit machines. This results in kind of a rat's nest of wiring... compounded severely by Atari's inclination to have a separate power supply for absolutely everything. There's a brick sized supply for the main box, and one smaller one for each of the disk drives. These are all uncooled, self-contained units that lie around waiting to be tripped over.

Getting all this rigging into flight configuration is quite a party. The system unit has a minimum of four cables coming out of it, the monitor has two, and the disk drives have another two each. To start up the system you have to turn on the computer, the monitor, and each of the disk drives. Each drive has its own power switch, conveniently located on the backside, safe from all human intervention.

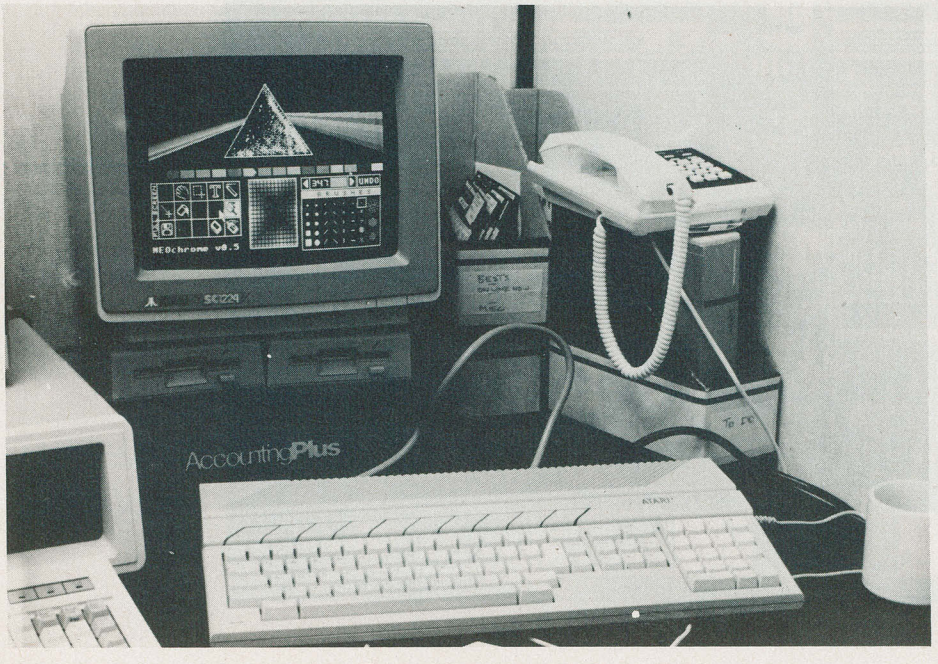
After that, things get easier. GEM takes a while to come up, but Atari has thoughtfully provided a mind bending demo screen for you to stare at while you wait. GEM itself holds no surprises, especially for anyone who's used either GEM on a PC,or played with a friend's Macintosh. The one complaint I've heard... and feel obliged to endorse... is that the menu bar across the top of the screen is too easily accessible. Unlike on the Mac, you need no key press to pull down a menu. This means that every time you sweep your cursor too close to the top of the screen you end up with an unwelcome drop down. You have to stop what you're doing and carefully click on the backdrop to put the menu away.

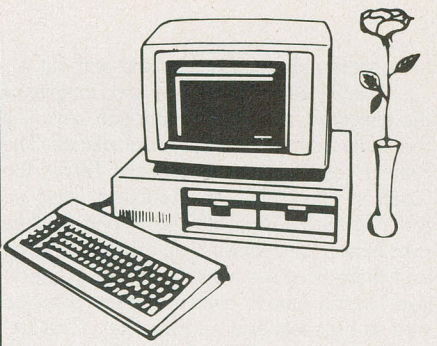
One of the first things you'll probably want to do is pull down the Desk menu and select the Control Panel. This lets you set things like your "double click" speed, the keyboard repeat rate, whether you get key click sounds, as well as the system date and time. You'll probably pass on the latter two options, since the Atari has no nonvolatile clock. Resetting date and time every time you boot would be far more tedious than on the PC, and hardly worth the effort.

By far the nicest function of the Control Panel is to let you set up your screen colours. There are three little slide controls that adjust red, green and blue components. As you move the little doohickeys up and down they show a number from zero to seven. This is indicative of the way the Atari deals with all RGB monitor output. You'll be seeing a lot of this kind of adjustment, since all the graphics programs use a similar mechanism.

One word about screen colour. The range of tones available makes it easy to set up a dim background with bright lettering and boxes. I'm convinced that this is easier on the eyes than the "imitation paper" black on white approach. No matter how crisp the display... and it's awfully good... staring into a brightly lit picture tube is still pretty much the same as staring at a fluorescent fixture. After all, they both flicker at about the same nerve wracking rate.

However, the Atari monitor is one place in the hardware where no liberties have been taken. The colours are vivid, and the sharpness is about as good as I've ever seen on an RGB tube.You can put a dot about half the size of a pin head on the screen, and tell which of 512 colours it is. The alternative monochrome monitor gives you something much like a Hercules card would do with a PC... which is excellent. Monochrome is about two hundred dollars cheaper, but the colour is so good it would





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be a shame to get this machine without it.

The ST keyboard is not bad, in spite of the distorted, rhomboidal function keys. All the usual keys are in the usual places. The Return key is huge, as are the Shifts, the Control, the Tab, the Alternate, and so forth. There's a separate cursor pad, with its own Insert, Clr Home, Help and Undo keys, and there is also a very complete numeric pad, which has its own arithmetic keys as well as brackets and an Enter key. The feel is a bit rattly, but not as bad as I've seen on machines costing twice as much. Rollover appears to be limited to two keys at a time, but that's about par for the course.

At this point the retailers are not likely to let you take a double sided drive as your first one. This is annoying. Although the double sided drives are over twice as expensive... close to five hundred dollars, versus two hundred for the single sided type... they offer what should be the minimum storage capacity for a machine of this type. Furthermore, their availability this early in the game indicates that the double sided drives could easily become the standard later on, leaving single sided drive owners holding onto a lame duck.

The floppy drives are quite fast, although over time they do seem to fall just a little short of the speed one would prefer. The ST is oriented heavily toward the three and a half inch, Macintosh type "microfloppy" disk. However, the file format is said to be nearly identical to standard MS-DOS, and third party five and a quarter inch drives are said to be on the way. This would permit at least ASCII text files to be passed easily into the PC environment.

The ST mouse is of course the main way you're intended to interact with the system. Unfortunately, I don't find the mouse to be particularly well designed. The two buttons wrap around the box, limiting your grip area on the sides, and the back end of the box is much too wide and square to fit well into even a large palm. Hopefully some benevolent third party supplier will take up the slack and offer a replacement.

I feel strongly about some of these minor complaints mainly because overall I liked the ST so much. When you see something that's merely very, very good, you tend to wish it were perfect.

As far as the hardware goes, there is a lot of shakeup still on the way. Atari announced that it will be bringing out its one megabyte 1040 ST in February, so it may be in stores by the time you read this. If so, it should be worth seeking out. Apart from the extra RAM... for which there is no immediate application, apart from RAMdisks... the 1040 will have one double sided disk drive built in. There'll also be a new RF output. Presumably this will be NTSC compatible, since the average VCR won't deal with anything less.

The Soft Parade

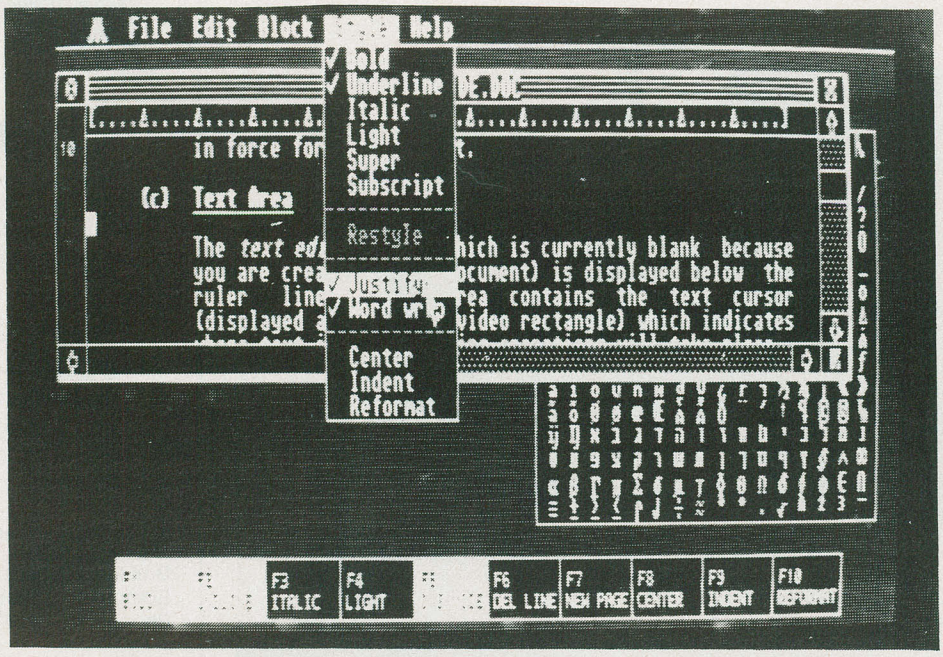
So, suppose the ST really is a wonderful machine. What can you actually *do* with it? Quite a lot, actually. The bundled applications rival the best you've seen on other systems. Let's have a look at them, one at a time.

The word processor... 1st Word... is the product of GST Holdings, in Cambridge, England. It's no toy: this is a full featured system, offering all the block, search, and format options that you'd expect. It's very reminiscent of MacWrite. The only feature missing is support for wild and wonderful text fonts. You do get the more functional effects like on screen boldface, underline, or italics. What you don't get is multi-coloured and oversized text. In fact, there's no font size setting at all in the current version. This is not really a criticism: 1st Word is obviously designed to provide support for printer text modes... unlike things like MacWrite, which must create text from scratch using dot matrix graphics.

DB Master is a cardfile database system I reviewed many months ago on the Macintosh. The program hasn't changed much in being ported over to the ST. It works much along the classic lines of PFS:File, but adds support for fancy fonts and... on the ST... colour. This won't replace dBASE but it's certainly all the database most individuals will ever need.

Megaroids is another program previously seen on the Macintosh. This is not really a commercial program, being essentially a demo for the Megamax C Compiler... which is obviously now available for the ST. On the Mac, Megaroids was by far the best microcomputer implementation ever done of the popular arcade game Asteroids. On the ST it's even better, since it now works in colour. Different waves of asteroids come in different shades. This is a totally professional piece of software, and just as fiendishly difficult to master as the arcade original.

ST BASIC and LOGO obviously can't be summed up in a sentence or two. The LOGO seems to be a version of Digital Research's well established DR LOGO so it



should be pretty reasonable. The BASIC is quite complete, but a tad kinky. The trick is that it insists on using four separate windows: List, Output, Command, and Edit. Splitting up these normally transparent functions, then adding some obscure function key commands, makes the system peculiar to work with... without actually limiting what you can do with it. Atari assures us that a new BASIC... upwardly compatible with the existing one... is already on the way.

The real gem in the software bundle is a little graphics utility called Neochrome. Although the version included is prerelease... version 0.5... the program already has a lot of powerful features and a very winning personality. You can draw freehand, paint with various brush shapes, place lines point to point, and even cut and paste blocks. The usual icon menu takes up the lower half of the screen, but you can flip in and out of full screen display using the ESC key, or keep the menu and just scroll the picture window.

A complete selectable sixteen colour palette divides the menu from your working window. Below that is a small boxed window that does double duty. While your cursor is in the menu area, this small window shows your full colour palette and lets you pick colours directly for use in one of your sixteen active "paintpots". When you cursor into the drawing area, the window shows a constant magnified view of what's immediately under the cursor. This combined full size and blown up display makes Neochrome a lot of fun to fool with.

All in all, the ST is about as much fun as you can stuff into a flat, off white box. It's a lot like what the Mac could have been like if it had been in colour... and within the average working human's price range.

Software Supplement

Included in the customary press kit, Atari sent along a listing of software available... or expected imminently... for the 520 ST.We pass a highly compressed version along, together with the reminder that there's many a slip 'twixt the cup and the lip.Some of this stuff is out there already... we know, we've seen it. Some of it probably never will be. Most of it, however, should be on the rack sometime shortly after you read this.

This list reflects only my personal impression of which titles look either promising or interesting or both. I've left a lot of products and producers out, just to get this down to manageable size.

- Atari Corp: Aside from the LOGO, BASIC, and Neochrome already being bundled with the ST, Atari should soon have ST Writer, an upgrade of its successful 800 series word processor. GEM Write and GEM Paint are very close to market. A CP/M command line interface is being included in the ST developer's kit, and will hopefully be made available in other ways as well. The hot arcade game Joust is promised, as is an enhanced version of the eight bit Star Raiders game.

- Activision: From a name you know but may have temporarily forgotten, come two adventure type games: Borrowed Time, and Hacker.

- Antic Software: A mixed bag is being offered, ranging from several "bio-toon" computerized cartoons to Lattice C and MetaPascal.

- Batteries Included: Canada's own success story is backing the ST down the line. Degas, a comprehensive paint program is already in the stores. Homepak... the integrated terminal, word processor and database well known in the eight bit world... is on the way.

- Dragon Group: Someone had to do it. These folks have "4xForth"... that's 'four by fourth', get it? Forth has long been available for the 68000, so the ST implementation was inevitable.

- Electronic Arts: The company whose ads have championed Commodore's Amiga breaks down and announces two products for the Atari ST, the well known Financial Cookbook, and Marble Madness... a version of the soul destroying arcade hit.

- Haba: A familiar name to Mac users, Haba has a long list of helpful products on the way. Keep track of your loot with the Haba Check Minder... or decide who to leave it to, with Haba Wills.

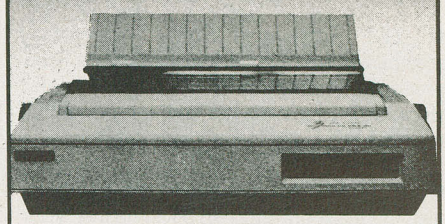
- Infocom: The text adventure specialists... as usual... have no trouble porting their ASCII antics onto the new machine. The whole series of high class Infocom entertainments will no doubt be in your stores by now, ranging from the sword and sorcery of Zork and Enchanter to the Sci-Fi of Starcross and Planetfall. Infocom proves that your mind is the ultimate graphics machine. Fine time to tell you, now that you've blown all that money on an ST.

- Microprose: The simulator specialists come up with Silent Service, a mammoth World War II submarine game.

- Optimized Systems Software: Some serious stuff, for a change of pace. Try Personal Diskit, a disk utility package, Personal Pascal, or Personal Prolog.

- Quickview Systems: Zoom racks got rave reviews on the PC. Now try this unusual database system on your ST.

THE BEST FOR LESS



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● Sierra On-Line: Good news for Ultima buffs... Ultima II is coming for the ST.

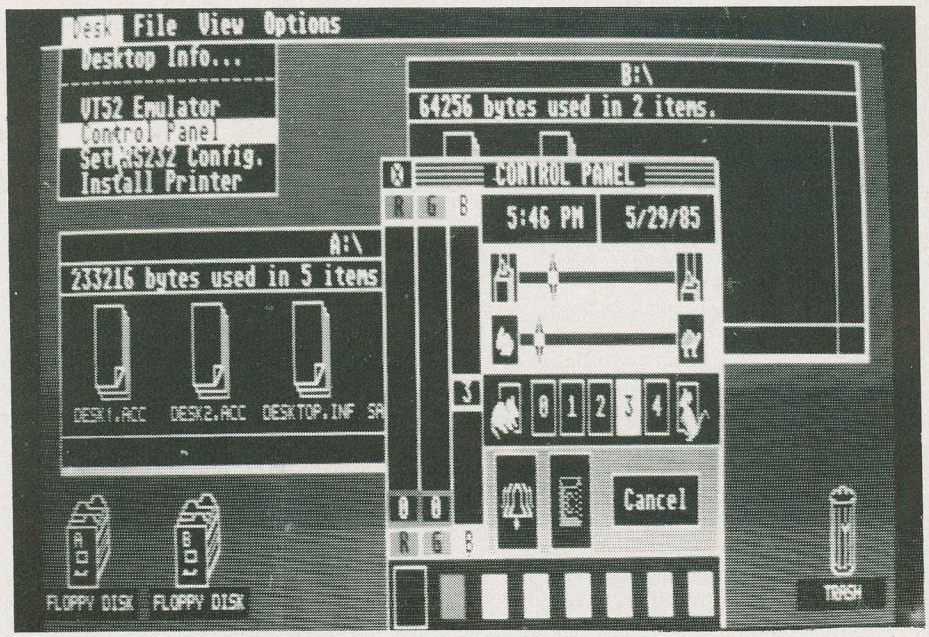
● Spinnaker: The novel series of literary adventures is coming to the ST. Dragon World, Amazon, Fahrenheit 451, Treasure Island, Wizard of Oz and even Perry Mason are all adapted from the literary works of the same names.

● SubLogic: This should be worth waiting for. Sub Logic is bringing its ever popular Flight Simulator and its new Jet fighter game to the ST.

● Synapse/Broderbund: Brimstone, Essex and Mindwheel are very peculiar text adventure games, or "Electronic Novels" Now you can try them on the ST.

● TDI Software: Some interesting possibilities here, including Andra... a "professional typesetting" system... and Modula-2...the very hip new language that everybody's been talking about.

● VIP Technologies: If you're into numbers, and you insist on using an ST to further your addiction, The Professional is just for you. This is touted as "a complete work alike of Lotus 1-2-3".



● XLent Software: This sounds promising. The Typesetter is described as an "electronic page design" system, for newsletters and presentations. **CN!**

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Colour Output	Yes	Optional	None	Optional
Number of Colours	512	16	None	16
Disk Drive	3.5"	5.25"	3.5"	5.25"
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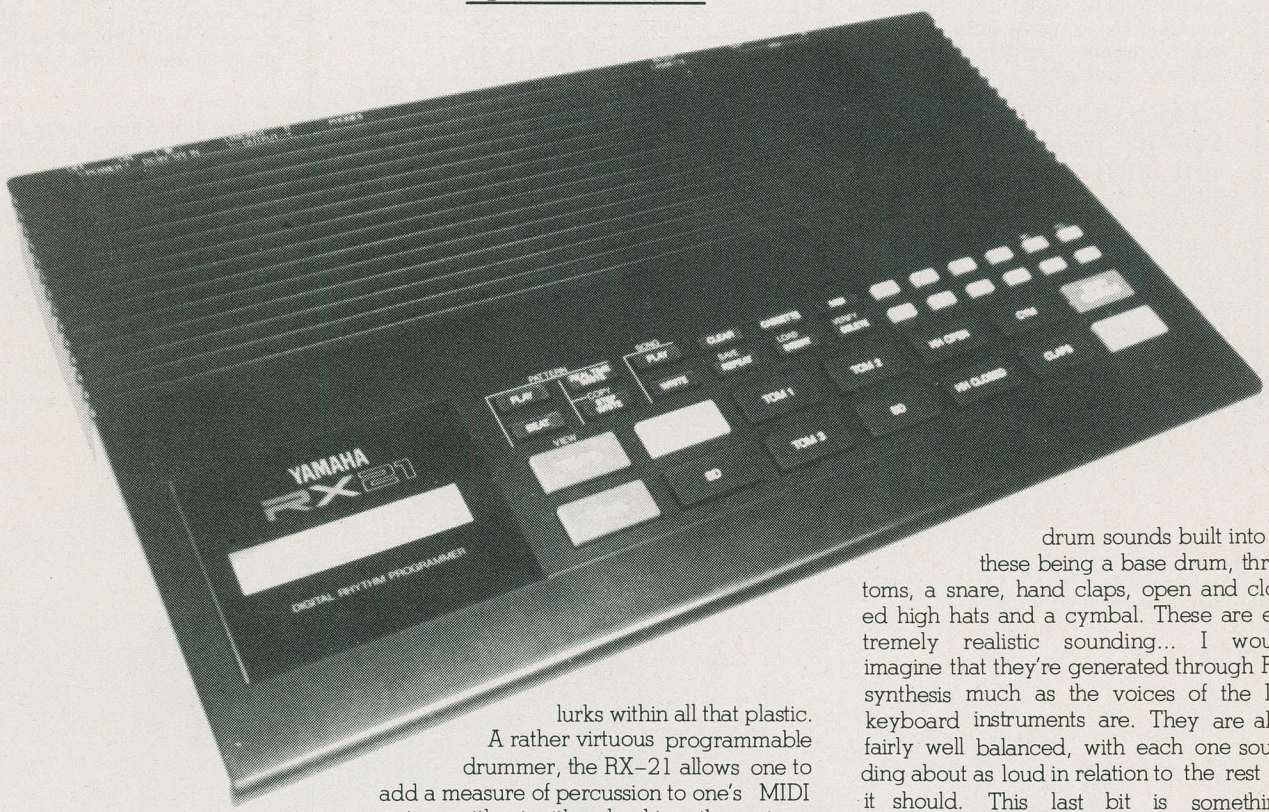
Circle No. 9 on Reader Service Card

The Yamaha RX-21 MIDI Drummer Review

Percussion can add a whole new facet to one's music. Here's a look at a low cost MIDI drummer with surprisingly powerful features.

by Steve Rimmer



There seems to be a decided trend in the design of computer compatible music stuff to make the cases look like doorstops or pre-empted TR7s. They're all starting to crop up as wedges. This is fairly high tech looking, I suppose, if you have one or two of them, but it almost completely precludes any intelligent use of one's space when they start to accumulate, as it is one of the singular characteristics of wedges to slide off each other if attempts are made to stack them.

The Yamaha RX-21 digital drum box... 'scuse me, "digital rhythm programmer"... is a good example of the wedge mindset at its most extreme. It has a good thirty degree slope to its front. The only thing that'll stay on it is dust.

What perhaps apologizes for the rather angular case design of the RX-21 is what lurks within all that plastic.

A rather virtuous programmable drummer, the RX-21 allows one to add a measure of percussion to one's MIDI system without either hocking the cat or getting a second job to pay for one's new toys. It sounds extremely good, and is characteristic of most of Yamaha's MIDI toys in that it's cleverly designed and moderately flexible in a microcomputer environment.

Finally, it's extremely light, and can be crazy glued to a wall where it's extravagant use of table space really won't matter.

Eat to the Beat

As with many MIDI based instruments, the RX-21 will stand all by itself, and could go through its entire life without ever seeing a MIDI connector. It can be used as a traditional programmable rhythm machine. While this may not interest one in the context of MIDI performance, as we'll see in a moment it's a decent feature even once one does get one's computer going.

The RX-21 comes with nine hard wired drum sounds built into it, these being a base drum, three toms, a snare, hand claps, open and closed high hats and a cymbal. These are extremely realistic sounding... I would imagine that they're generated through FM synthesis much as the voices of the DX keyboard instruments are. They are also fairly well balanced, with each one sounding about as loud in relation to the rest as it should. This last bit is something drum boxes usually get wrong.

The unfortunate thing about the RX-21's drums is that they *are* hard wired, that one cannot change the drum sounds one has available programmatically, as one can change the voices of a DX keyboard. This is one of those things that would only really appeal to advanced users of the box in a MIDI environment, but it would be a worthwhile facility.

I should note, in this context, that there is a version of the box, the RX-21L, which has a different set of drum noises entirely, the L standing for "latin".

The basis of the RX-21 is a pretty decent pattern editor which allows one to step through repeating drum patterns, popping in the available drum noises at various places in a measure. The box shows one what one is editing in a small liquid crystal display window.

The RX-21 stores its patterns in non-volatile memory. There is space for a hundred patterns in all, but only the lower fifty-six can be programmed by mere humans. The upper ones are preset as "a variety of useful and exciting drum patterns you can play immediately"... or so says the manual. I suppose that some people get excited easily. None the less, they've been well chosen, and are useful for integrating into one's own stuff.

The pattern editor makes extremely good use of the limited number of characters the RX-21's display affords it, and creating new patterns is not too onerous. This can be handled under computer control... I saw a drum pattern editor for the CX5M music computer recently which handled it very well. Unfortunately, as is usually the case with Yamaha's MIDI hardware, the system exclusive messages to allow one to write one's own software for this function seem to be unavailable.

Patterns can be created in real time or beat by beat. In the former mode one starts the drum box stepping though a blank pattern and hits the front panel keys that correspond to the drums. The box records what one plays in the appropriate beats of the pattern, a kind of silicon tape recorder. This takes a lot more getting used to than one might think... the drum box of necessity quantitizes everything, and one must be extremely tight to get one's beats to wind up where one expects them.

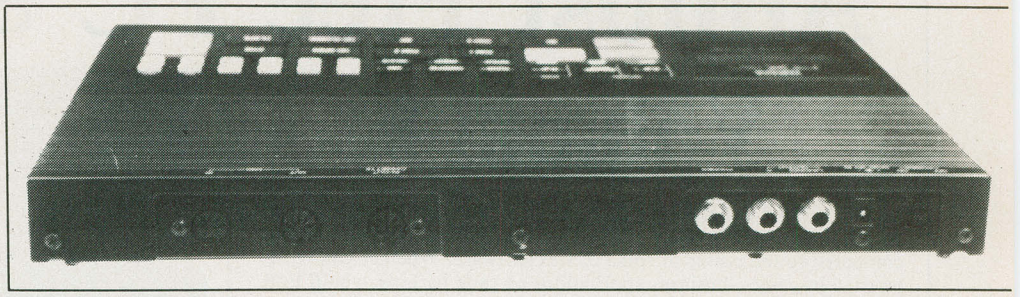
The other alternative is to manually place the beats in the pattern, which the RX-21 refers to as "step write programming". While more precise, this process makes it harder to create really natural sounding patterns.

There are a number of interesting nuances one can get into in designing patterns. For example, there's a large green button on the RX-21 marked "accent" which allows one to increase the volume of any beat in a pattern. The time signature of patterns can be varied, offering one the opportunity to transform Phil Collins into Micky Hart. Some of the more peculiar times can have the RX-21 producing some amazing rhythmic effects.

Having created a number of patterns... or, if one is slothful and just wants to get the box going, having checked out some of the pre-set patterns... one can create an RX-21 song. A song is a number of patterns strung together. The RX-21 can accommodate up to four songs having an aggregate number of patterns of up to five hundred and twelve.

The song editing process of the RX-21 isn't a whole lot more involved than is pattern editing. The command structure for creating songs is reasonably well thought out, and one can get quite adept at it after a few hours of meddling with it. Again, though, it cries out for a computer based song editor.

It would be useful to be able to give the patterns that one creates names, rather than just numbers, as is the case with the voices of the DX instruments. This is probably the only conceptual bottleneck in the song editing process.



Patterns, and songs made of them, can be saved to a cassette recorder in digital form, so you can call 'em back and edit them again at a later time.

And Now... MIDI

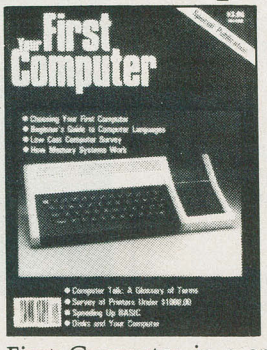
All of this is, of course, very pedestrian stuff. It starts to get interesting when one notes that there are MIDI connectors out back of the RX-21, and that the whole dog and pony show can be driven by a computer. The computer I used was an IBM PC running Personal Composer, but virtually anything with a MIDI interface would do, including an Apple with a Passport card, a CX5M, a Mac or even an Amiga.

There are two things one can do with a computer and the RX-21. No, actually, there are three, the third being pattern and song editing. However, as I noted a few minutes ago, this is a bit tricky given the information vacuum that Yamaha keeps around its toys.

Having created a song in the RX-21, it is normally played using the system's internal clock. This means that one stabs the start button and the song starts bopping out of one's speakers. The speed of the clock can, of course, be adjusted to change the tempo of the drums.

It's possible to instruct the box to use an external clock coming at it through the MIDI interface. This allows one's songs to be automatically synchronized to a computer based MIDI music playing program, such as Personal Composer. This is amazingly un-

Your First Computer



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Almost Free PC Software

Volume 8

This is another collection of fairly large applications. We've had to spread them over two disks. However, the extra three bucks is nothing compared to the power of some of this software. Whether you're interested in games, business applications or code hacking, you'll find something of interest in this larger than usual collection of programs. In addition to the programs themselves, the set includes all the support files needed to use them.

Load-Us allows users of the popular Lotus 1-2-3 and Symphony programs to run them on a hard drive. It isn't a cracking program, but, rather, a preboot to avoid the inconvenience of this copy protected software for legitimate users.

DDCal is a very clever perpetual calendar and desk diary. It keeps track of your appointments and performs several other functions that you probably thought could only be done on the backs of match books.

PC Key Draw is the remarkable public domain paintbox program which blows away so many commercial applications. It'll handle multiple screen images, business graphics and superb computer art...all in full colour. It's worth the cost of this package all by itself.

CPU is a tiny program to tell you the effective speed of your system.

Xray is a remarkable co-resident utility to monitor what a program is doing while it's busy doing it. It allows you to interrupt the execution of your code and have a look inside.

Game...well, there are no words for this program, or, at least, none that are printable. This game is a bit rude... depending on just how weird your mind is, it can get pretty bizarre. This program does use some suggestive language, and we recommend that young or sensitive users not boot it.

Tune is a very small music generator to make noises from within batch files. It's useful to see where things are in a complex process.

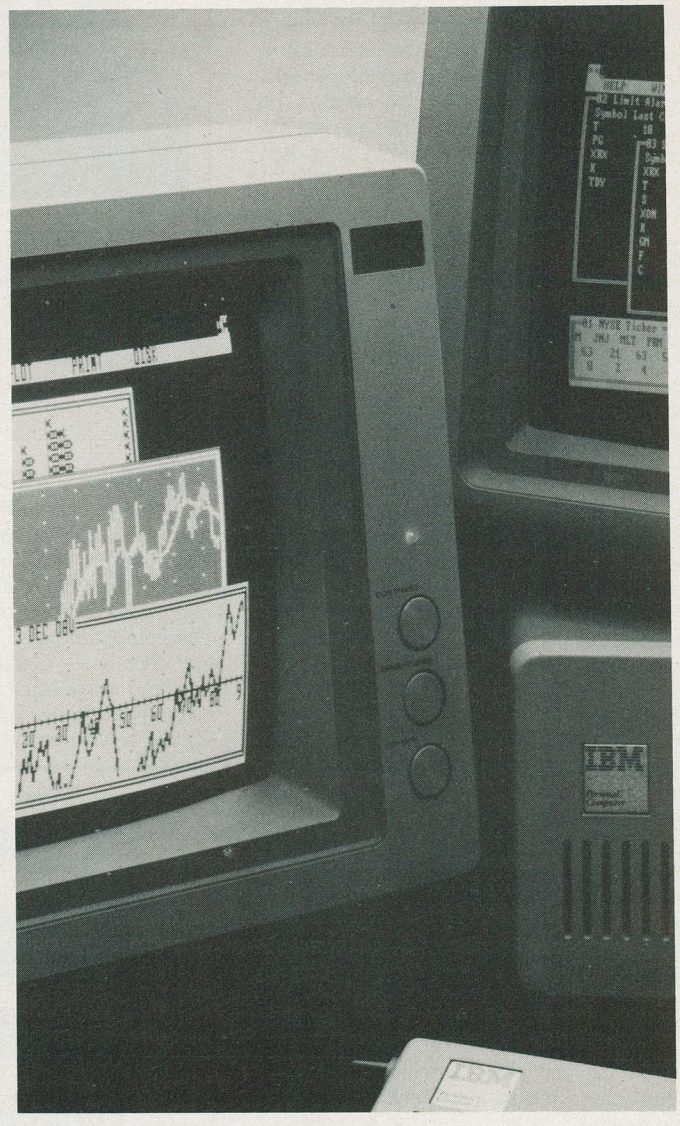
Chasm, or cheap assembler, is just the thing if you want to get into assembly language programming but don't want to spring for the Microsoft macro assembler package. It's reasonably fast, not too huge... it'll run in as little as sixty-four kilobytes... and, above all, cheap.

Getdir is a resident directory utility. It allows you to see what's happening on your disks even if you're in the middle of doing something else.

CopyPC, not to be confused with the commercial Copy II PC, is a quick disk backup utility for the IBM.

Lookit is a full screen browsing program to let you scroll forward and backwards through text files... a sort of a tiny word processor that can't edit anything.

Syslock is a security device for hard disk users. By implementing this package on your XT or compatible no one without a secret password will be able to have access to your computer.



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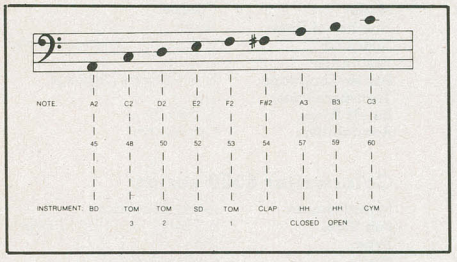
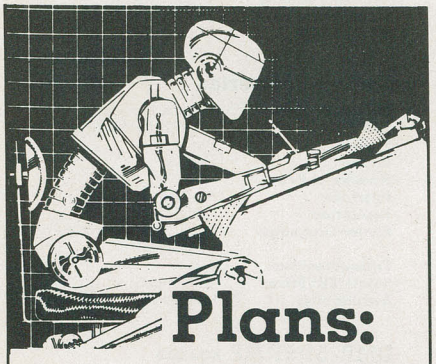
complicated... one just assigns the RX-21 a MIDI channel and lets the whole affair sort things out for itself. It works splendidly, and allows one to combine all the good bits of the RX-21 with those of a computer.

Where the greatest power of the RX-21 lies... at least, where I came upon it... was in simply using it as a set of drum voices. The system provides for this... one simply assigns it to an otherwise unused MIDI channel and plays the appropriate MIDI note numbers into it. This is the basic scale arrangement for the drum values.



In composing with music and percussion, I just add another stave to the affair to hold the drum notes and assign it to the MIDI channel that the RX-21 is listening to. This does produce some rather peculiar looking scores, but it works once one gets one's head around it. The best part of it, though, is that it allows one to orchestrate MIDI music with percussion that doesn't have to be at all repetitive. You program every beat of the drums just as you do every note of the musical parts of a score. As such, one can have deviations from a pattern wherever one feels like having them.

This also allows for the creating of stranger time signatures than the RX-21 itself allows for.



Plans:

Instrument:	**RX-21 digital rhythm programmer**
Manufacturer:	**Yamaha**
Compatible with:	**Any system with a MIDI interface**
List Price:	**$450.00**
Available from:	**XLelectronix Computer Music Centre, 317 College Street, Toronto, Ontario M5T 1S2, (416) 921-9841**

Hot and Nasty

There are a few aspects of the RX-21 which reflect its low price. The most offensive of these are its control buttons, which appear to be descended from soft rubber pencil erasers. Playing with them is much like attempting to render Handel's music for the royal fireworks on a ten dollar push button phone from Woolco. However, if you are looking at the RX-21 primarily for use in a MIDI system you can largely ignore this limitation... you won't have to push the buttons all that often.

The RX-21 comes with two well written books. The first is a lucid owner's manual which looks a lot bigger than it really is by virtue of its being in English, French and German. Aside from a lack of advanced programming information it's extremely complete. The second is a book of patterns representing the pre-set patterns in the RX-21's little plastic mind. This is extremely handy, and saves having to plot these things out by hand.

The RX-21 is a superb little box, and extremely good value if your MIDI music cries out for a top down rhythm machine.

CN!

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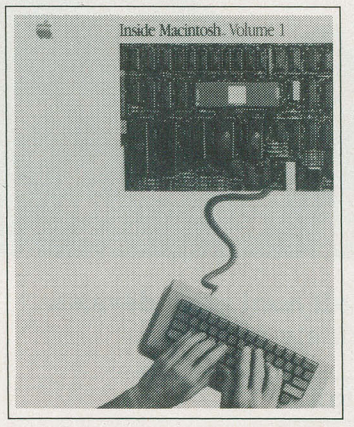

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Plotter Survey

Perhaps the most precise of all hard copy devices, plotters come in a variety of types.

by CN! Staff

CalComp 1042GT

Manufacturer: CalComp
Bed Size: 34 by 44 inches
Type: Pen
Mode: Cutsheet/Rollfeed
Number of Pens: Eight
Interface: RS-232-C or IEEE-488
Resolution: 0.025mm
Hard Clip: Yes
Plotter Language: Host Computer Basic Software
Transparencies: Yes
Special Features: Plot speed 6 ips
Retail Price: $19,750.00
Availability: Compuserve

CalComp 1043GT

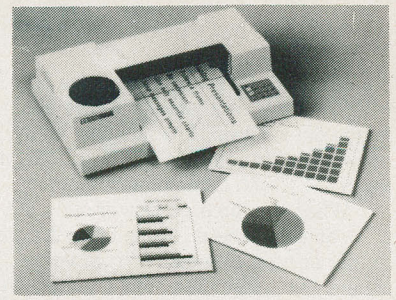
Manufacturer: CalComp
Bed Size: 34 by 44 inches
Type: Pen
Mode: Cutsheet
Number of Pens: Eight
Interface: RS-232-C or IEEE-488
Resolution: 0.025mm
Hard Clip: Yes
Plotter Language: HCBS
Transparencies: Yes
Special Features: Plot speed 14 ips
Retail Price: $14,950.00
Availability: Compuserve

CalComp 1044GT

Manufacturer: CalComp
Bed Size: 34 by 44 inches
Type: Pen
Mode: Cutsheet/Rollfeed
Number of Pens: Eight
Interface: RS-232-C or IEEE-488
Resolution: 0.025mm
Hard Clip: Yes
Plotter Language: HCBS
Transparencies: Yes
Special Features: Plot speed 14 ips
Retail Price: $24,200.00
Availability: Compuserve

ColorPro (HP 7440A)

Manufacturer: Hewlett-Packard
Bed Size: 8.5 by 11 inches
Type: Pen
Mode: Cutsheet
Number of Pens: Eight
Interface: RS-232C or IEEE-488
Resolution: 0.025mm
Plotter Language: H-P Graphics Language
Transparencies Yes
Special Features: 60 bytes buffer
List Price: $2,204.00
Availability: Hewlett-Packard



Colorwriter 6120

Manufacturer: Gould Electronics
Bed Size: 11 by 17 inches
Type: Pen
Mode: Cutsheet
Number of Pens: Seven
Interface: RS-232-C, Centronics parallel
Resolution: 0.05mm
Plotter Language: H-P Graphics Language
Transparencies: Yes
Retail Price: $1,595.00
Availability: Compuserve

Colorwriter 6300 series

Manufacturer: Gould Electronics
Bed Size: 8.5 by 11, or 11 by 17 inches
Type: Pen
Mode: Cutsheet/Rollfeed
Number of Pens: Seven or ten
Interface: RS-232-C or IEEE-488
Resolution: 0.025mm
Plotter Language: H-P Graphics Language
Transparencies: Yes
Special Features: Digitizing sight
Retail Price: $2,695 to $3,095
Availability: Compuserve

DMP-51/52 series

Manufacturer: Houston Insruments
Bed Size: Up to 22 by 34 inches
Type: Pen
Mode: Cutsheet
Number of Pens: One
Interface: RS-232
Resolution: .025mm
Plotter Language: Digital Microprocessor Plotting Language
Transparencies: Yes
Retail /List Price: Call for price
Availability: Metagtonix

DMP-51/51 MP series

Manufacturer: Houston Instruments
Bed Size: Up to 22 by 34 inches
Type: Pen
Mode: Cutsheet
Number of Pens: Fourteen
Interface: RS-232
Resolution: .025mm
Plotter Language: Digital Microprocessor Plotting Language
Transparencies: Yes
Retail /List Price: Call for price
Availability: Megatronix

DPX-2000 Drafting Plotter

Manufacturer: Roland
Bed Size: 594mm by 432mm
Type: Pen
Mode: Cutsheet
Number of Pens: Eight
Interface: Centronics parallel, RS-232-C serial
Resolution: 0.0125mm per step
Special Features: IBM and H-P compatible
List Price: $5,995.00
Availability: Amdek

DXY-101

Manufacturer: Roland
Bed Size: 370mm by 260mm
Type: Pen
Mode: Cutsheet
Number of Pens: One
Interface: Parallel
Resolution: 0.1mm per step
Plotter Language: H-P Graphics Language
Transparencies: Yes
Retail Price: $899.00
Availability: Amdek

Plotter Survey

DXY-880

Manufacturer: Roland
Bed Size: 380mm by 270mm
Type: Pen
Mode: Cutsheet
Number of Pens: Eight
Interface: Centronics parallel, RS-232-C
Resolution: 0.05mm per step
Plotter Language: H-P Graphics Language
Transparencies: Yes
Retail Price: $1,595.00
Availability: Amdek

DXY-980

Manuxfacturer: Roland
Bed Size: 380mm by 270mm
Type: Pen
Mode: Cutsheet
Number of Pens: Eight
Interface: Parallel, serial
Resolution: 0.05 mm per step
Plotter Language: H-P Graphics Language
Transparencies: Yes
Special Features: IBM and H-P compatible
List Price: $1,995.00
Availability: Amdek

Facit 4550

Manufacturer: Facit
Bed Size: 8.5 by 11 inches
Type: Pen
Mode: Cutsheet
Number of Pens: Six
Interface: Centronics parallel and RS-232-C
Resolution: 0.1mm step size
Plotter Language: H-P Graphic Language
Transparencies: Yes
Retail Price: $1,445.00
Availability: Printerm Data

Facit 4551

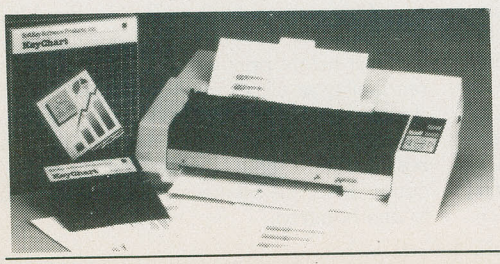
Manufacturer: Facit
Bed Size: 11 by 17 inches
Type: Pen
Mode: Cutsheet
Number of Pens: Six
Interface: Centronics parallel and RS-232-C
Resolution: 0.1mm step size
Plotter Language: H-P Graphics Language
Transparencies: Yes
Retail Price: $1,810.00
Availability: Printerm Data

Gulton Color Graphic Printer

Manufacturer: Gulton
Bed Size: 8.5 by 11 inches
Type: Thermal Transfer
Mode: Cutsheet
Number of Colours: Seven
Interface: Centronics parallel, or video RGB
Resolution: 100 dpi
Transparencies: Yes
Retail Price: $9,975.00
Availability: Webster Instruments

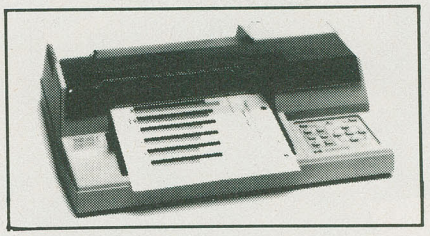
HI-80 Plotter

Manufacturer: Epson
Bed Size: 8.5 by 11 inches
Type: Pen
Mode: Cutsheet
Number of Pens: Four
Interface: Centronics parallel
Resolution: N/A
Plotter Language: BASIC, H-P GL emulation
Transparencies: Yes
Special Features: Bundled with KeyChart
List Price: $899.00
Availability: Epson Canada



HP-7470A

Manufacturer: Hewlett-Packard
Bed Size: 8.5 by 11 inches
Type: Pen
Mode: Cutsheet
Number of Pens: Two
Interface: IEEE-488, RS-232-C
Resolution: 0.025mm
Plotter Language: H-P Graphics Language
Transparencies: Yes
List Price: $1,858.00
Availability: Hewlett-Packard



HP 7475A

Manufacturer: Hewlett-Packard
Bed Size: 11 by 17 inches
Type: Pen
Mode: Cutsheet
Number of Pens: Six
Interface: IEEE 488, RS-232-C
Resolution: 0.025mm
Plotter Language: H-P Graphics Language
Transparencies: Yes
List Price: $3,233.00
Availability: Hewlett-Packard

HP 7550A

Manufacturer: Hewlett-Packard
Bed Size: 11 by 17 inches
Type: Pen
Mode: Cutsheet
Number of Pens: Eight
Interface: IEEE-488, RS-232-C
Resolution: 0.025mm
Plotter Language: H-P Graphics Language
Transparencies: Yes
Special Features: 1024 bytes buffer
List Price: $6,657.00
Availability: Hewlett-Packard

IBM 7371

Manufacturer: IBM Canada
Bed Size: 210mm by 297mm
Type: Pen
Mode: Cutsheet
Number of Pens: Two
Interface: RS-232-C, IEEE-488
Resolution: 0.025mm
Transparencies: Yes
List Price: $1,725.00
Availability: Authorized IBM dealers

IBM 7372

Manufacturer: IBM Canada
Bed Size: 297mm by 420mm
Type: Pen
Mode: Cutsheet
Number of Pens: Six
Interface: Centronics, RS-232-C
Resolution: 0.025mm
Transparencies: Yes
List Price: $2,975.00
Availability: Authorzed IBM dealers

Microplot-44

Manufacturer: Gulton
Bed Size: 5 inches
Type: Thermal Transfer
Mode: Rollfeed
Number of Colours: One
Interface: Parallel
Resolution: 256 dot linear array across
Transparencies: No
Retail Price: $2,100.00
Availability: Webster Instruments

Microplot-80

Manufacturer: Gulton
Bed Size: 8.75 inches
Type: Thermal Transfer
Mode: Rollfeed
Number of Colours: One
Interface: Parallel
Resolution: 512 dot linear array across
Transparencies: No
Retail Price: $3,675.00
Availability: Webster Instruments

Superplot-80

Manufacturer: Gulton
Bed Size: 8.5 by 11 inches
Type: Thermal Transfer
Mode: Cutsheet
Number of Colours: One
Interface: RS-232, IEEE-488, Centronics parallel
Resolution: 100 dpi
Retail Price: $3,670.00
Availability: Webster Instruments

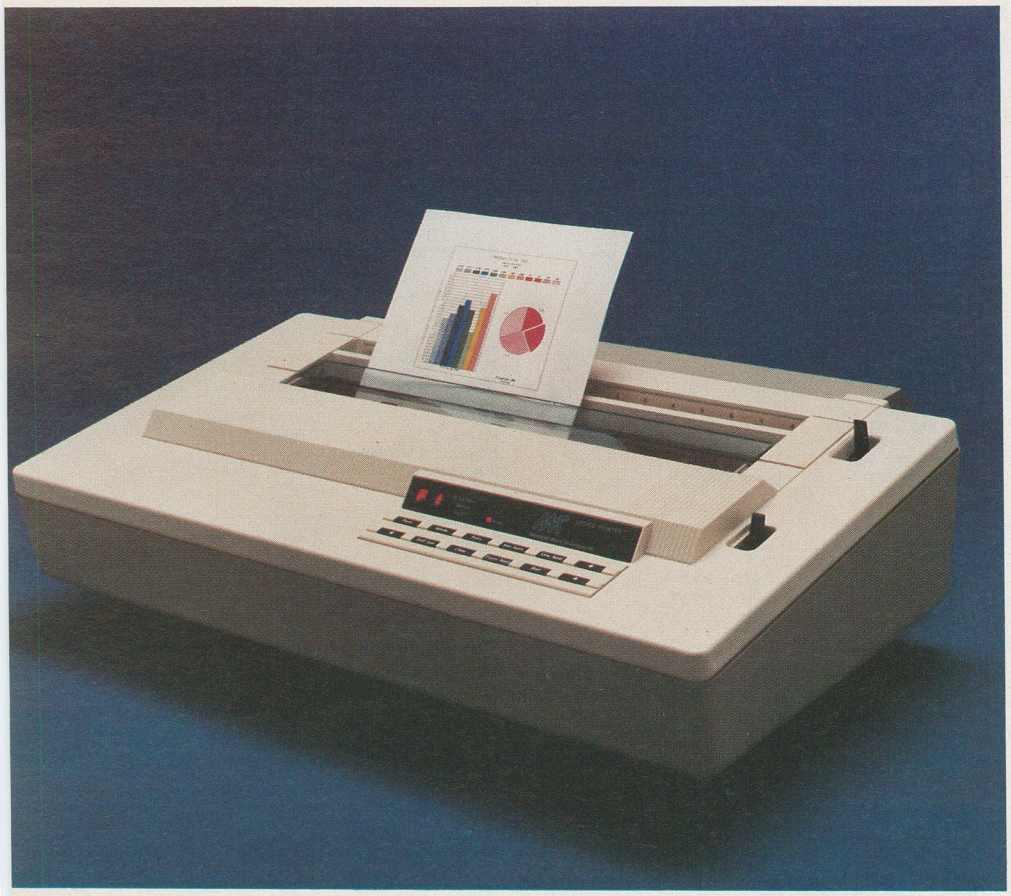
Taxan 710S

Manufacturer: Taxan Corporation
Bed Size: 11 by 17 inches
Type: Pen
Mode: Cutsheet
Number of Pens: Six
Interface: Serial
Resolution: 0.025mm
Plotter Language: H-P Graphics Language
Transparencies: Yes
Retail Price: $1,595.00
Availability: Compuserve

Sources for Plotters

● Amdek Electronics Canada, 1515 Matheson Boulevard, Mississauga, Ontario L4W 2P5, (416) 625-1144 ● Compuserve, 400 Alden Road, Markham, Ontario L3R 4C1, (416) 477-8088; regional offices in Ottawa, Montreal, Halifax, Calgary, Winnipeg and Vancouver ● Epson Canada, 285 Yorkland Boulevard, Willowdale, Ontario M2J 1S5, (416) 495-9955 ● Hewlett-Packard (Canada), 6877 Goreway Drive, Mississauga, Ontario L4V 1M8, (416) 678-9430 ● IBM Canada, 350 Steeles Avenue East, Markham, Ontario L3R 2Z1, (416) 474-2111 ● Megatronix Corporation, 3640 Weston Road, Weston, Ontario M9L 1W2, (416) 742-8015 ● Printerm Data, 122 St. Patrick Street, Suite 210, Toronto, Ontario M5T 2X8, (416) 977-1711 ● Webster Instruments, 1134 Aerowood Drive, Mississauga, Ontario L4W 1Y5, (416) 625-0600

The AMT Colour Printer Review



Hard copy can be very monotonous indeed... black is such an unadventurous colour of ink. This printer overcomes all that.

by Frank Lenk

If you're into computers and you're also into colour, you've got a problem. By now you've likely shelled out over five hundred dollars for a high quality colour monitor. Your satisfaction with this technicolour tube and its cathode ray display probably only serves to heighten your disappointment, when you realize that your printer persists in reducing all your colourful creativity to the same old grotty, dotty, black and white paperwork.

There are few solutions to this modern tragedy. One is to pop a further couple of kilobucks on a plotter. Plotters tend to be very good with thin lines, but are sadly limited in their ability to handle large areas of colour or large blocks of text. Unless you work in a specialized area like CAD, you'll probably forgo the plotter route.

A new alternative would be to pick up the AMT office printer, from Advanced Matrix Technology. After a couple of hours in close contact with the AMT, I thought to myself that simply everyone would want one of these. After I learned the price... about thirty-five hundred Canadian dollars... I was forced to amend this rash opinion. Only some of us will want to acquire the AMT... but the ones who do will want it badly.

Good Offices

You have to get to know the office printer a bit more closely to realize how well it lives up to its name. Although I can't really envision a private individual wanting to acquire an AMT, the machine packs just about every feature you'd ever need in an office environment. It does very high speed draft printing, moderately high speed letter quality print, and moderately slow... but highly attractive... colour graphics. Furthermore, the AMT absolutely shines in the area of user interfacing. Whether you're changing print modes, changing ribbons or changing personality ROMs, everything turns out to be quite effortless. This is the way all printers should work.

Before I get carried away, I'll mention one thing that the AMT does not do particularly well. Its draft quality print is by no means the most readable I've ever seen. In the ten characters per inch mode, some of the letters end up looking like... well, like a whole bunch of tiny little dots. The twelve pitch print looks considerably better, and the equivalent of Epson compressed output begins to look pretty respectable. The italics are decent at any pitch, with a nice smooth slant rather than the jagged line common to cheaper dot matrix printers.

Still, you may be willing to put up with the marginal print quality in the draft mode, simply because the AMT can spew it out at a breathless two hundred and fifty characters per second. If you stick to the tighter pitch modes, this could be darned useful for program listings and the like.

Once you get a peek at the higher quality modes, however, you may find it hard to go back. Memo mode gives you fully formed characters much like what you'd get from a well handled typewriter. Letter mode does sort of the same, but goes for two passes of the print head. This results in an amazingly crisp print that could easily pass for daisy wheel output. The specification sheet mentions that this mode offers the equivalent of a thirty-two by seventy-two dot matrix... considerably short of the three hundred dot resolution of Apple's LaserWriter, but way ahead of your garden variety matrix print head.

With appropriate font ROMs, the AMT is capable of generating some amazingly fine half height print which doesn't sacrifice readability at all. It can also do very good double height print that only barely reveals its dotty origins. The letter mode speed is a reasonable forty-five characters per second, while the memo mode increases this to one hundred.

Naturally, any of the font and mode combinations is available in any of the four standard colours, these being red, blue, yellow or even... ugh... black. The colour is selectable in line by means of conventional escape command sequences, so you can do a quick colour change and then overstrike to produce many colours not actually present on the ribbon. Green is one that springs immediately to mind.

The lack of quality at draft speeds is somewhat surprising, considering the AMT sixteen wire print head. Theoretically, sixteen pins should work almost as well as twenty– four, due to the practical difficulty of orchestrating larger numbers of pins and getting them all to hit the paper at one time.

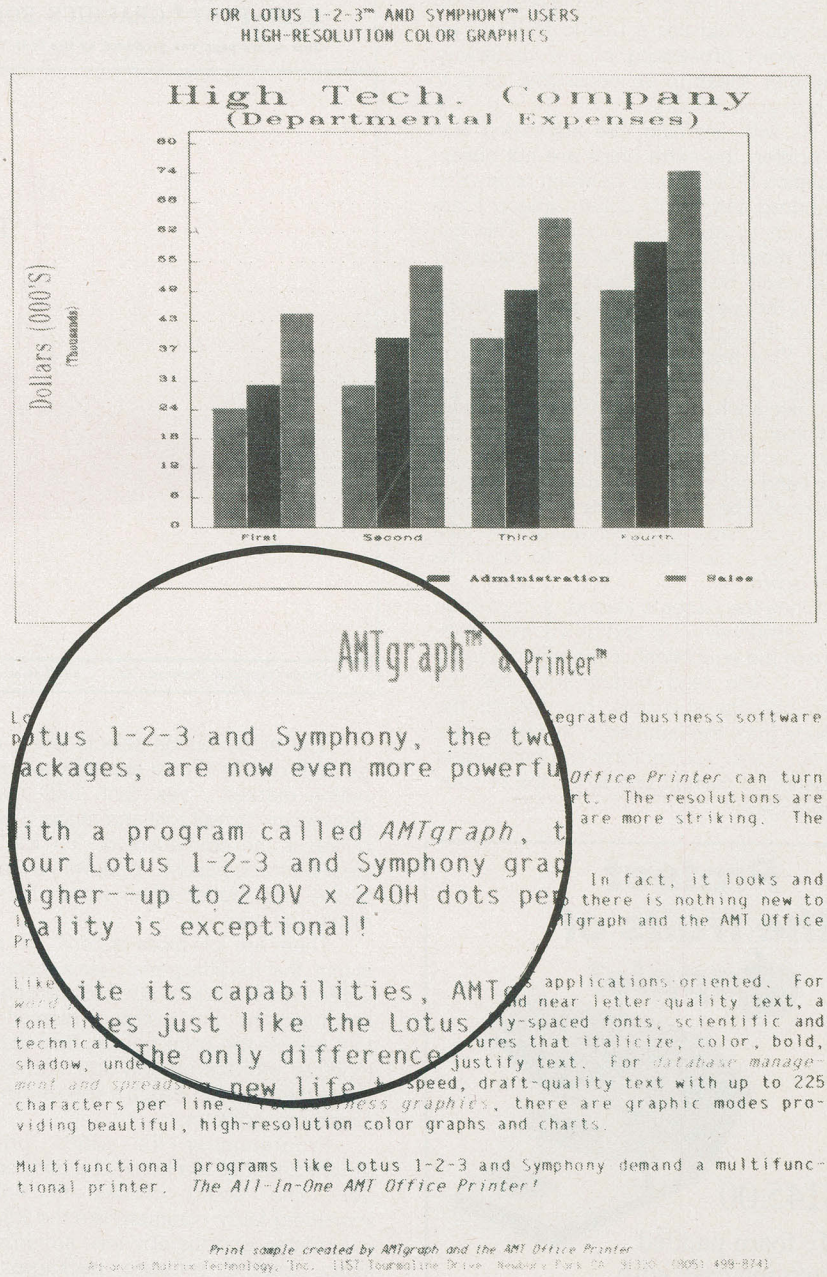
However, those sixteen pins really do shine through when it comes to graphics. The AMT is rated at up to two hundred and forty dots vertical by four hundred and eight horizontal. By my calculations, this is roughly double what you could squeeze out of a standard Epson FX type printer. Graphics tend to look like the letter mode print, completely free of annoying jaggies. They also cause you to recall why you wanted a colour printer in the first place. By judicious use of overstriking, the AMT can come up with some truly delicious colours. Filled areas show little or none of the banding common to dot matrix dumps, and for once the slightly granular matrix texture looks kind of pleasing.

While dumping one of the demo pictures it came with, the AMT demonstrated another one of its hidden features. The roller provides bidirectional paper control, which allowed the demo program to add lettering by reverse feeding the paper and overstriking a completed graphic.

There is one drawback in filling large blocks of colour. It tends to suck the printer's ribbon dry at an uncomfortable rate. The AMT is smart enough to avoid hitting the yellow strip just after it's done the black... thus minimizing colour contamination. Still, at sixty dollars... yes, sixty... a crack, you may well think twice about painting with the broad brush.

However, all is not as black as it seems. For regular text or simple black and white graphics, AMT supplies an all black ribbon cartridge. The printer cleverly senses if one of these is installed, and runs not four but seven separate print tracks in order to fully utilize the ribbon's surface. Assuming that each of these tracks comes out about as long as a normal ribbon, this will bring the per ribbon cost down to under ten dollars.

Like everything else on the office printer, the ribbon installation is a snap. The entire top deck of the printer opens like a car hood, giving you access to not only the ribbon cartridge, but the roller, dip switches and god knows what other hardware as well. There's an interlock that automatically takes the printer off line when the lid is lifted. Actually inserting the ribbon takes a bit of care, but I only managed to do it wrong once... and to do that I had to carefully ignore all advice offered by the manual.



Mechanically, the AMT looks about as good as any printer could look. The office printer was designed in the States, but was financed by Oriental capital. It is presently being manufactured in Singapore under the guidance of an American plant manager. This could be the best of both worlds.

Pushing the Buttons

All the AMT's electronic guts reside under a metal cover at the rear of the unit. The bulk of the circuitry occupies a single printed circuit card, which pops out for service. On the exposed side of the card you'll discover a row of memory chips, in which is housed the office printer's real intelligence.

Apart from a RAM buffer chip on the end, the rest of these are personality ROMs. The AMT takes a standard twelve K RAM buffer, which can be expanded up to forty K.

Several fonts can be fitted at any one time, and all the available fonts can be accessed either directly from the front panel or via escape codes sent from the host computer. An emulator ROM allows the AMT to accept command sequences for various common printers, including the Diablo 630, Qume Sprint 11, IBM colour printer, Diablo C–150 colour graphics printer or any other weird machine that you might care to arrange for on special order. No matter what the AMT is emulating, it will always be will-

ing to accept any of its own special codes. Thus you could use a Diablo ROM to get your word processing chores underway, then later sneak in an occasional code to change print colours.

As with anything else associated with the printer, the extra chips are not cheap. Emulation ROMs go for between ninety and a hundred and twenty dollars apiece. Extra fonts run to about sixty dollars. This can swiftly mount up... but the extra capability could easily be worth the price.

All the special fonts and features can be got at through the AMT's front control panel. Your first experience of this will be in loading a sheet of paper. There's no external roller knob, so you must let the printer load itself. Hold the sheet down into the roller slot, hit the form feed button, and get your hand out of the way to avoid a wicked paper cut. The printer whips the paper right out of your hand and even adjusts the little roller bar... the paper bail... to hold the sheet down.

Once the paper is loaded, you position it in several ways. Up and down arrow buttons are the equivalent of the manual roller knob. A line feed button advances the paper one line at a time, but deducts the distance from the number of available lines on your page. The set form can be pressed to define the current line as the top of your current page.

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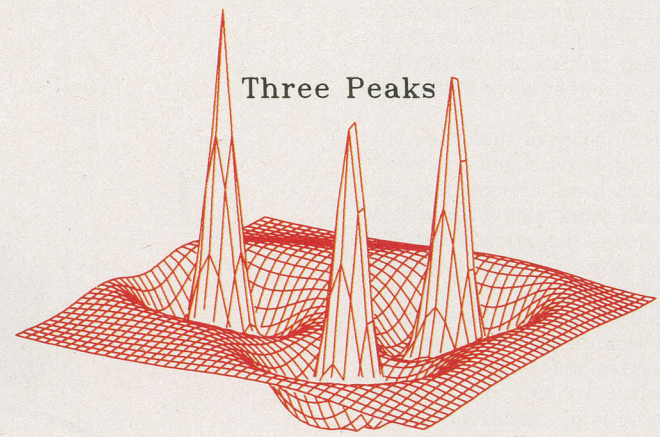
CCSI–PLOT® GRAPHICS SOFTWARE FOR THE AMT OFFICE PRINTER™

This entire page was produced by the CCSI–PLOT library of graphics subroutines on the AMT OFFICE PRINTER.



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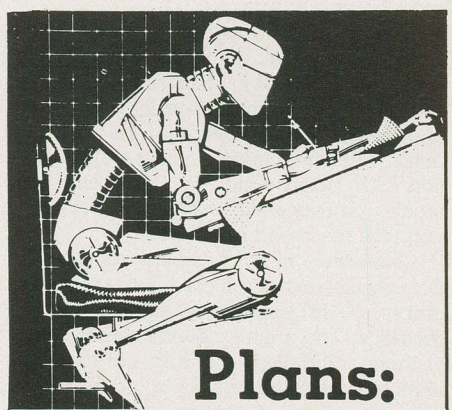
The mode button selects letter, memo or draft quality. Fonts are selected using a button marked... yes, font. LED readouts show your current font and mode. The print button is the equivalent of "on line". The clear button is handy... it allows you to empty the print buffer when you've taken the printer off line.

There are lots more options... so many, in fact, that the little panel uses a special key, a diamond symbol, to invoke a second set of key functions. For instance, diamond and font selects the print colour, and diamond together with the up and down arrows will move the paper to match a special pin point alignment indicator.

Programming the office printer's graphics modes is a horse of a different colour. You could choose to emulate something fairly common, like the IBM colour printer, and thereby take advantage of many existing software packages. This route, however, would fail to exploit the AMT's superior capabilities. Since the AMT is still relatively new, there are not that many programs that specifically support it. Genamation supplied me with literature on some that do. InfoGraphics is a presentation quality charting and graphing package. MASS–11 is a scientific and technical word processor that can create sophisticated page layouts.

AMT has it's own AMTgraph, which lets you produce high resolution hardcopy from standard Lotus 1–2–3 graphs. AMT-font simplifies creation of custom download fonts in the office printer's format. AMT-kernel is a library of C routines that can convert generic graphics data first into vectors and then into the correct bit mapped form for output on the office printer. AMT-capture sounds like a generally useful little utility. It lets you redirect serial or parallel output to a disk file for reuse or further processing.

Despite its price, the AMT Office Printer has the look of a solid value in the office hard copy market. It's been around for almost a year, so third party developers should begin taking notice of it any time now. After that... if the volume gets a little higher... maybe the price will come down to where the rest of us private citizens can get in on the fun. **CN!**



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IBM® PC (8088)		**Z-80** (CP/M™-80, TRS-80™)	
ZBasic™	13.7 sec.	ZBasic™	30 sec.
BASICA™	2,190 sec.	Mbasic™	2,520 sec.

10 iterations of the Sieve from Byte, January, 1983

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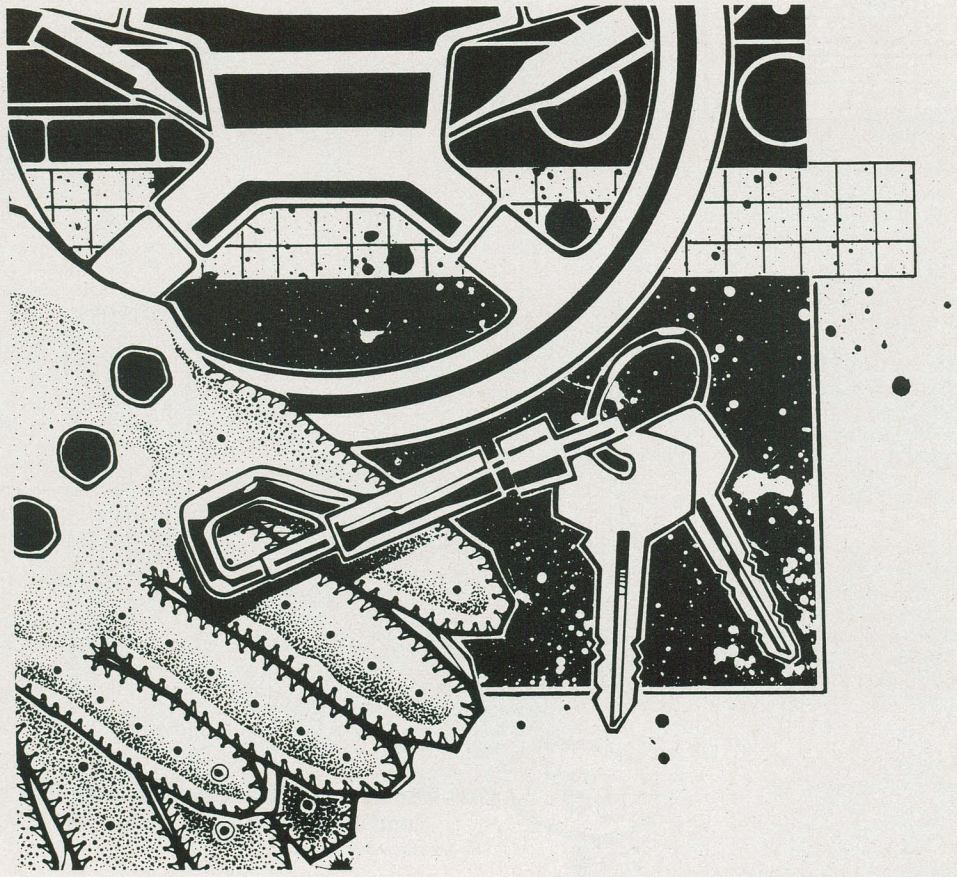
Micros and Macros

Prokey is one of the most useful accessories one can hide on a PC's disk, replacing countless tedious keystrokes with a single stab. A brief tutorial on its more enlightened uses follows.

by Rod Potter



Most neophyte computer touch typists have the good sense to bow humbly before the speed and precision of the professional data entry operator. With deft fingers and quick eyes, these special humans sometimes give one the impression that they are actually hard wired to the terminals at which they type. For the rest of us however, there are a variety of solutions to help make clumsy fingers more efficient.

The most obvious answer is to upgrade one's typing skills with one of a number of touch typing books and software packages which are now on the market. Another solution which should appeal to most users... be they slothful or industrious... is to make one's keystrokes *worth* more. With a keyboard macro program, single keystrokes can become quite powerful. Single keystrokes can gain the ability to execute dozens of commands, move between programs and compensate for non-standard keyboards... and non-standard typists.

Programs such a SuperKey, SmartKey and ProKey don't provide extra fingers, but they do give users a convenient means of storing repetitive keyboard sequences so that they can be replayed with a single keystroke or two. Never again will you have to re-type obscure words every time you need them. Just define a macro to take care of it.

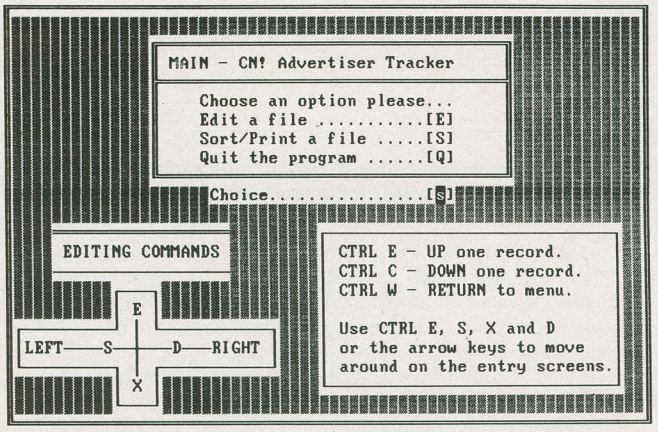
These types of shortcuts are definite time savers, but the potential power of keyboard macros goes far beyond this use. Macros can make it much easier to integrate separate applications such as dBASE III, WordStar and Lotus 1-2-3. While these programs are not incompatible, transporting data between them does entail some effort on the part of the user. A well chosen set of macros will make the job much easier.

All Keyed Up

Virtually all macro programs, ProKey included, let you define

macros interactively or with a simple pop up macro editor. Using ProKey, one presses the *alt =* key combination to begin a macro, followed by the key or key combination to be defined, and the series of keystrokes which form the macro. Typing *alt–* will end the macro and store it in memory. Later, the macro can be viewed and revised or saved to a disk file by entering *alt/* to call up ProKey's pop up menu.

Macros are stored as ASCII text files and can also be edited with any ASCII text editor. The Mock MailMerge listing herein is



A "user-friendly" Menu/Help screen created with PC-Write and the Box.Pro macro file.

essentially a straight printout of a macro file, with the exception of the comments between square brackets and the blank lines which have been entered for the sake of clarity.

To be sure, ProKey macros have a decidedly garbled look about them. There is no structure, but then again ProKey can hardly be called a programming language. Instead, it is the non–programmer's program patcher. It can extend the usefulness of many applications by emulating commands and functions which are not supported.

Within WordStar, ProKey can be used to create new editing commands to move up or down a paragraph or to the end of a sentence. Because Prokey enables one to define variable fields for use within a macro, it is trivial to create macros for turning on and off printing features. The combination *alt I* for example, can be defined to insert a printer code to access *italics*. If a variable field has been included as part of the macro, the user simply types in the text which is to be italicized and then hits the return key. A second printer code is automatically inserted to turn off the italic print. When used with several different programs, these types of macros can help create a standard user interface... that is, a set of commands which are standard for the person using them.

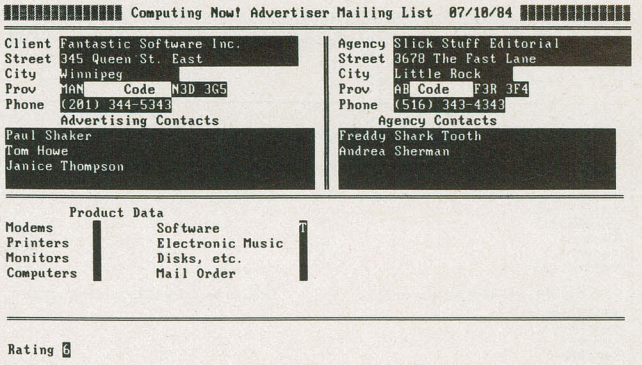
Mock MailMerge

WordStar productivity can be further increased with a set of macros to create a rudimentary letter processor. Using the double dot command to enter non–printing comment lines in a document, a form letter can be produced with a variety of variable fields. Simply create a form letter with variable fields such as *&NAME, &ADDRESS* and *&CITY* to match the field names used in the macro set, open a work document and press *alt f1 to begin the macro.*

From the listing of Mock MailMerge, the macro begins by reading a file called LET into a work file. The macro then prints user prompt lines such as

.. Enter NAME:

using WordStar's non–printing double dot command. After each prompt, the user merely types the name, address and city for each letter. These fields are stored as separate macros which



have been named *alt 1, alt 2* and *alt 3.*

Then the macro uses WordStar's search and replace to locate &NAME, &ADDRESS and &CITY in the form letter and replaces them with the strings stored in *alt 1, alt 2* and *alt 3.* Finally, some extra returns are deleted and the main macro, *alt f1*, is called again. Yes, ProKey permits macros to call themselves.

While the macros are executing, the screen does tend to get a bit jumbled... ProKey operates faster than WordStar can perform screen updates. Still, when the current letter is completed, all returns to normal and the user is prompted to enter the next set of variables. Execution can be halted with ProKey's control escape command.

This letter processor macro set is not as elegant as the merge systems available with some of the better word processors, but it is inexpensive and easy to create. For mailings of less than fifty letters it is a good alternative. I have used a more involved version of this macro to simultaneously generate a mailing label file

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and a list of letters written along with a form letter. For better performance, all files used by the macros can be kept on a RAM disk.

```
•
<begdef><altf1><ctrlk><ctrlr>LET<enter>                [Read Form Letter]
<enter>
<ctrle>.. Enter NAME: <begdef><alt1><enddef><enter> [Define NAME Macro]

<ctrlq><ctrla>&NAME<enter>                [Replace &NAME with <alt1>]
<alt1><enter>
gn<enter>
<enter>
<enter>
<cmd>d1<enter>

<ctrlq><ctrla>&ADDRESS<enter>             [Replace &ADDRESS with <alt2>]
<alt2><enter>
gn<enter>
<enter>
<enter>
<cmd>d1<enter>

<ctrlq><ctrla>&CITY<enter>                [Replace &CITY with <alt3>]
<alt3><enter>
gn<enter>
<enter>
<enter>

<ctrlq><ctrlf>.pa<enter>                  [Delete Stray returns]
b<enter>
<ctrlx><ctrlt><ctrlt><ctrlt><ctrlt><ctrlt><ctrlt><ctrlt><ctrlt>
<ctrlt><ctrlt><ctrlt><ctrlt><ctrlt><ctrlt>

<altf1><enddef>                           [Start again!!!]
•
```

Mock Mailmerge.

Using similar techniques, it should be possible to devise macro sets which enable users to easily write keywords, titles and references to separate files for indexing and footnoting purposes.

Alternate Characters

IBM alternate graphics characters are a welcome addition to both programmers and word processors alike, but the cumbersome method of entering them using *alt shift number* sequences makes them all but impossible to use. ProKey enables one to create macro sets such as BOX.PRO to make the use of alternate characters easier.

While programs like dBASE II/III can display graphics characters, the dBASE editor, MODIFY COMMAND, sets the high bit on each character, rendering it unreadable. Editing dBASE programs with a different editor, in conjunction with ProKey, one can avoid a number of nasty bugs in MODIFY COM-

```
ProKey Macro List          Press <enter> to exit.
* = guarded macro          Press A to Annotate, E to Edit, or G to Guard.

<althom>  ┌
<altup>   ─
<altpgu>  ┐
<altlft>  └
<altctr>  │
<altrgt>  ┘
<altend>  ■
<altdn>   ▌
<altpgd>  ▪
<ctrlhom> ╔
<ctrlup>  ═
<ctrlpgu> ╗
<ctrllft> ╚
<ctrlctr> ║
<ctrlrgt> ╝
<ctrlend> ▒
<ctrldn>  ▓
<ctrlpgd> ▌
```

Defining the cursor pad to work with the Alt and CTRL keys provides PC-Write and other ASCII editors with a convenient set of graphics character.

MAND and enter alternate characters with programs such as PC–Write and XY Write.

Using PC–Write for instance, I have found it very convenient to use the cursor keypad as the basis for a set of macros called BOX.PRO. Using the cursor keys in conjunction with alt and control, its possible to access a complete set of double and single box type characters plus a number of the shading characters. This macro set makes it very easy to create attractive menu and data entry screens. For wordsmiths, these additional characters enable

```
        B:LET   PAGE 1 LINE 8 COL 33                    INSERT ON
L----!----!----!----!----!----!----!----!----!----!----!----!----------R
 ProKey Command:                          Press <Enter> to exit

 L list all macros        | R read in a macro file    | S suspend ProKey
 E edit/create a macro    | W write out a macro file  | F fast mode
 A annotate a macro       | M merge in a macro file   | O one finger mode
 G guard a macro          | C clear all macros        | P position help line
 D delay in a macro       |                           | H help level
 V view ProKey commands   |                           | K disk wait mode

&ADDRESS                                                                  <
&CITY                                                                     <
                                                                          <
Dear &NAME,                                                               <
                                                                          <
Yes, it slices, it dices, it prints phoney dollar bills... and it will last
a lifetime... (maybe not yours)                                           <
                                                                          <
                                                                          <
                                                                          <
.pa                                                                       <
-------------------------------------------------------------------------P
```

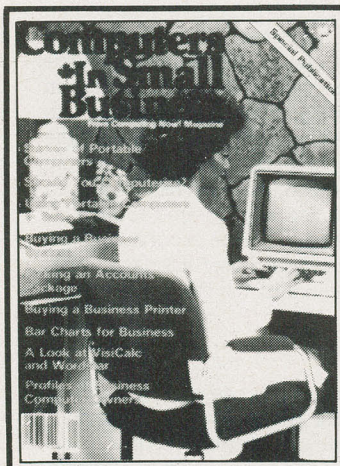
Prokey's pop-up menu is a fast way to edit macros "on the fly" and makes it easy to read, write and merge macro files.

one to spruce up charts and even create custom forms.

For the thousands of users who have griped over the peculiarities of the standard IBM PC keyboard, ProKey provides a keyboard layout utility which lets one alter the entire keyboard layout. This enables Prokey to be used more effectively on a wide variety of PCs, and it permits one to modify the keyboard to suit the habits and preferences of individual typists.

Predefined layout files are provided for Dvorak and IBM Selectric configurations. These and other files can be installed and altered to suit. Users can swap keys such as the troublesome backslash and shift keys.

While this article has dwelt upon the virtues of ProKey, most of the other macro programs on the market perform in much the same fashion. Many users, including this writer have found ProKey to have a more elegant user interface, but others may well prefer SuperKey or SmartKey, depending on their own needs. But, after all, that is precisely what these macro programs are for, to cater to biases, habits and arbitrary preferences of individual users. **CN!**



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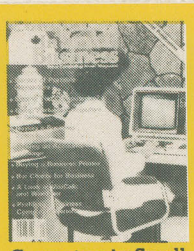

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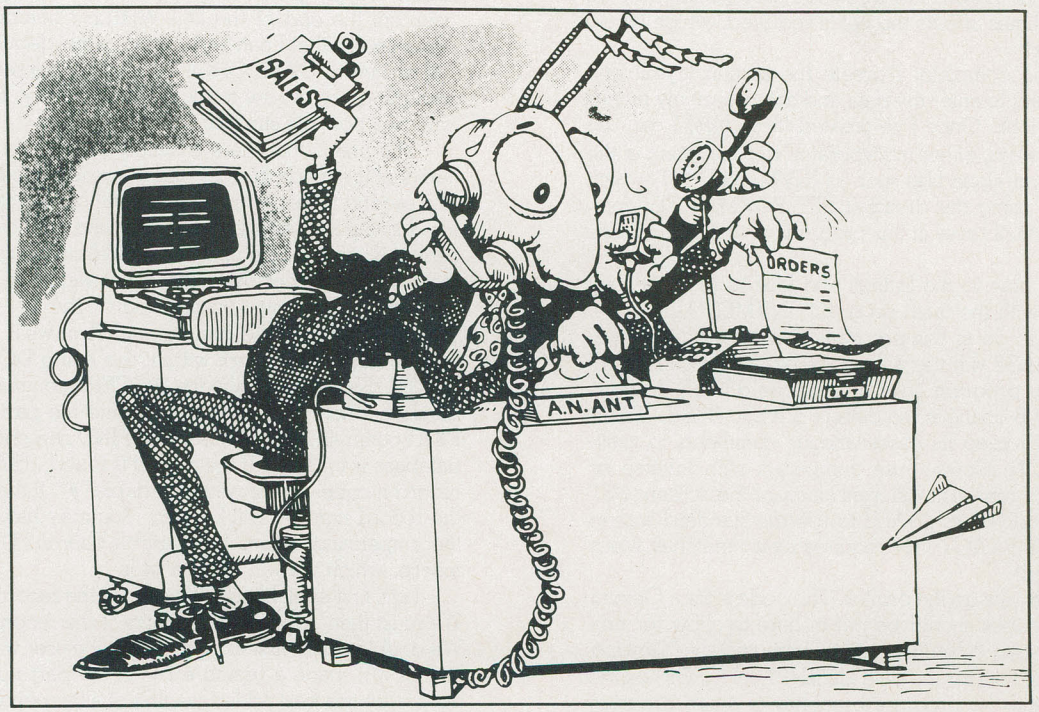
Inventory in dBASE II

Inventory control for anything more than a couple of apples and a few Mars bars can be an exercise in counting your fingers. Here's a complete inventory management system in dBASE II that will make it all add up.

by Chris Vandersluis



This article is another foray into the dark and forbidding jungle of dBASE II. While one thinks of dBASE as a data base manager, it is actually a programming language that deals specifically with data files. Its syntax and vocabulary are similar to Pascal and yet, it is almost as forgiving as BASIC. Even a novice programmer can follow the structure of a dBASE program.

Over the next few pages we will be examining some of the features of dBASE using the accompanying program listing. If you are already an experienced dBASE user then flip ahead a few pages to the program. You'll find it well documented with remarks. If it looks like Egyptian hieroglyphics to you then flip back. We'll be going through the listing in detail.

To dBASEment

Before we look at the listing, I should mention some important notes regarding dBASE listings and the conventions used in them. First of all, dBASE listings are simple ASCII text files that can be typed in using the dBASE editor or a word processor, such as WordStar in the non-document mode.

Some conventions are used in writing dBASE files which make them much easier to read. Variables are listed in lower case. Remarks are any line beginning with an asterisk. IF...THEN and DO...WHILE loops are indented. You'll appreciate this when you go along to debug a listing with seven nested loops and ENDDOs and ENDIFs all over the place.

The program listing included here is a variation on an inven-

tory program I wrote for a manufacturing business. The program allows you to set up a master file of stock numbers to keep track of ongoing additions and sales of the inventory. The menu allows you to choose one of three reports which deal with shortages in the inventory, the value of the inventory and a complete listing of the inventory.

To get this system working, you'll need the files in this article, named as

INVMENU.CMD
INVCOST.FRM
INVLIST.FRM
INVMENU.FMT
INVSTART.CMD
INVSHORT.FRM

These should all be on one disk in drive B.

Once these are all typed in enter dBASE and type DO B:INVMENU.

The Works

The first step in creating a database file occurs with the computer off. First of all we have to decide what information we wish to keep track of and how we should do that. Determining the fields, their types and lengths is the most elemental and crucial part of the program. Next we must decide on the report format. That is, we must decide what information we need reported and how we need it. This sometimes affects the fields required, which would have to be updated.

Once this is all complete, I create the screen layout and determine how I want to enter my data and how I want my menus and sub-menus to look. Once I've created these files, I can use them in one of two ways, either incorporated into the listing of the program or as stand alone files such as INVMENU.FMT, which would be invoked using the dreaded SET FORMAT TO command. We'll use both of these in this program so that you can see how they work.

Let's move on now to the listings and look at them step by step. We will start with the main program, INVMENU.CMD.

The first thing to do in this program is to set up the system parameters that dBASE will use during the execution of this program. The first five program lines change the dBASE defaults. SET DEFAULT TO B changes the default drive to B. SET TALK OFF tells dBASE to keep its miscellaneous comments to itself. SET INTENSITY ON allows those computers with inverse or high-low intensity to highlight different parts of the screen. SET FORMAT TO SCREEN tells dBASE to use the standard screen format. Finally, SET EXACT ON requires exact matches when searching for records.

The next section sets up the printer. This code is for a Gemini 10X. Your printer codes should be put in here to allow for one hundred and thirty-two column printing. Immediately following this is a section that looks for the data file, INVDATA.DBF, on the disk. If it is not found the program branches to a sub program called INVSTART.CMD. Then the program tells dBASE to use INVDATA.DBF and to use the accompanying index called PARTNUMB.NDX.

The next section begins with the command DO WHILE *t*. This is the main loop of the program. The *t* is a true or false variable in dBASE. This command basically says "do forever".

Note the next few lines. They do a couple of very powerful things very quickly. First of all they set the screen format to INVMENU. That's the INVMENU.FMT we typed in. Then they call up this program with a simple READ. Note that a few lines ago we defined the variable *choose* by giving the value " ". Then we set the format back to screen so that we don't mess anything else up later. The advantage of this system is that you can call the file many times from within the program without having to retype it. In this case we will use the format file only for the menu. If you look at the INVMENU.FMT file you'll see that the file has a GET CHOOSE in it. After the READ, dBASE will have a value for *choose*. We therefore set up a series of cases to handle the menu choice.

```
* MENU.FMT
@  0, 5 SAY "+=============================================================================+"
@  1, 5 SAY "!                        Inventory Main Menu                                  !"
@  2, 5 SAY "+=============================================================================+"
@  3, 5 SAY "!                                                                             !"
@  4, 5 SAY "!          [1] Enter Stock                                                    !"
@  5, 5 SAY "!                                                                             !"
@  6, 5 SAY "!          [2] Sell Stock                                                     !"
@  7, 5 SAY "!                                                                             !"
@  8, 5 SAY "!          [3] Edit Master file                                               !"
@  9, 5 SAY "!                                                                             !"
@ 10, 5 SAY "!          [4] Report 1 - Shortages                                           !"
@ 11, 5 SAY "!                                                                             !"
@ 12, 5 SAY "!          [5] Report 2 - Value of Inventory                                  !"
@ 13, 5 SAY "!                                                                             !"
@ 14, 5 SAY "!          [6] Report 3 - Complete Inventory List                             !"
@ 15, 5 SAY "!                                                                             !"
@ 16, 5 SAY "!          [7] Exit dBASE                                                     !"
@ 17, 5 SAY "!                                                                             !"
@ 18, 5 SAY "!                                                                             !"
@ 19, 5 SAY "!               Enter your choice (1-7) ==>"
@ 19,47 GET choose
@ 19,70 SAY "!"
@ 20, 5 SAY "!                                                                             !"
@ 21, 5 SAY "+=============================================================================+"
```

INVMENU.CMD

The DO CASE tells dBASE to look for a menu choice. Depending on what the value of the variable *choose* is, the particular case will be executed. If none of the conditional statements is met, the program will loop back to the beginning when it encounters the end of the DO WHILE *t* command. Each case is remarked so that I can find it again while debugging or changing the program. CASE CHOICE = '1' is the section that will deal with the entry of new stock to the inventory. Here we must deal with two possible situations.

The first is that there is simply an addition of quantity to an item that is already in stock and is already listed on the master file. The second is that there is an arrival of new stock that is not yet listed in the master file. Either way, the quantity of the particular item in stock must be updated as well as the quantity of the item that is on backorder. Also, stock that had been back ordered and has now arrived must be updated on the list.

Here is how we'll handle that. First we'll set up a standard loop to allow us to work within, this being DO WHILE *continue* < > "N". Second we'll use the ACCEPT command to get the part number. Then we'll attempt to locate the part number with the FIND command. Remember that FIND can only be used when a database is indexed. If the record is found, dBASE will return the record number to the system variable "#". If the item is not found, the record number will be zero. You may have noted the use of the ampersand before the variable *search*. This is the use of a macro, which we will discuss later.

Let's first of all handle the case of the record not being found. We must then add the information of the record to the database. We double check first to be sure that the user wants to do this or if he has just made a typing error in the part number. If the user does want this part added we first of all append an empty record to the file with the APPEND BLANK command. We then call on the second method of using a format file. By placing the file directly into the command file, we can call it just as if it were a stand alone file. Note that we do not need to declare the variables as they are declared as the fields themselves.

If the record has been found we can handle this within the ELSE section of the IF...THEN loop. In this case we would be using a different format than we were previously. Once again we would use the READ command to execute the format. Note that we declared the variables that we will GET during the READ of this format. The variables that we will SAY are already defined as the fields. Once we get the information we need, we'll have to do a little math to adjust the various numbers to reflect accurate information regarding back orders and numbers actually in stock. Finally we'll end the DO WHILE *continue* < > "N" loop and return to the beginning of the case or go on as we choose.

The second case is a little simpler. Here we know that the part number must be in stock to be sold. Again we set up the same loop and the same situation to find the part. If the part is not found the program tells the user so and returns to the menu. If the part is found we use yet another format to display the current status of the part in question and ask for the amount sold. Here I have added another loop to be sure that the amount is correct. If it isn't, the program will continue with the SOLD.FMT until it is. By once again invoking the REPLACE command we put the proper amount into the stock variable. The loop then takes the user back to the beginning of the case or the menu as he chooses. You may have noticed the RELEASE command at the end of the last two cases. This is simply an instruction to tell dBASE to erase the values of the variables from its memory to keep itself from getting clogged up. dBASE can keep track of only sixty-four variables at a time.

The third case is designed to allow editing of the master file. We start this case in the usual fashion. After a couple of lines you may see something interesting. Note the command

STORE "? CHR(7), CHR(7), CHR(7)" to *beep*

This is how dBASE uses macros. A macro is a character or series of characters that represents another string of characters. In this case we will take the variable *beep* to represent three beeps of the speaker. The macro is called upon by placing "&" before the variable.

Carrying on, we once again use our by now standard FIND command to find the part and then we set up a format to allow us to see the status of the part. Something interesting about the format command is that if it is in the program itself, the @SAY command will be activated as it is passed and the @GET command will be invoked only if a READ occurs. Once we know the status of the part we set up a series of cases depending on what we want to do with it.

The CASE "E" is a READ command and activates the @GETS. The CASE "D" is a delete command. When dBASE deletes a record it does not automatically remove it from the file. It simply marks it for deletion and it can be RECALLed if the file is not PACKed. The CASE "R" handles recalls. The CASE "F" allows us to sequentially move forward a record and CASE "B" allows us to move back. Finally, CASE "Q" will bring us back to the main menu. If none of the cases is picked, the OTHERWISE command will give us a beep and an insulting message that should wake us up. If there has been a delete or recall in the file,

```
M=0,L=58,W=132
Y
Inventory Value Report
N
Y
N
20,PART
<Part Number
20,DESCRIBE
<Description
10,LOCATION
<Location
8,STOCK
<Stock
N
8,BKORDER
<Bkorder
N
8,COST
<Cost
N
10,TOTCOST
Total;value
Y
8,PRICE
,Price
N
10,TOTPRICE
Total;retail
Y
```

INVCOST.FRM

```
M=0,L=58,W=132
Y
Inventory Part List
N
Y
N
20,PART
<Part number
20,DESCRIBE
<Description
10,LOCATION
<Location
8,STOCK
In Stock
N
8,BKORDER
Bkorder
N
8,MINIMUM
Minimum
N
8,COST
<Cost
N
8,PRICE
<Price
N
```

INVLIST.FRM

PACK will do some file house cleaning before returning us to the menu.

The next three sections handle the three reports we want. The fourth case will calculate the shortages in the file. By using the REPLACE command, we can pass through the entire file and subtract the current quantity in stock or back ordered from the minimum required. This is done by specifying ALL as the parameters of records to modify. Thus

REPLACE ALL *shortages* WITH *minimum (stock + bkorder)*

will perform our calculations for each record. Now, if you think for a moment, you'll realize that this will produce a negative number for a part that is not short of stock. We want to keep those records out of this report so we tell dBASE to limit its report to those records for which the value in the shortage field is greater than zero, or

FOR *shortage* > 0

We also don't want every field listed in this report. We therefore have set up a specific report format called INVSHORT.FRM which tells dBASE what fields to print and in what order. Let's look for a moment at how to set up a report format. This process starts with a request to dBASE to start a report, that is, REPORT FORM INVSHORT. Then the following occurs

```
ENTER OPTION. M=LEFT MARGIN, L=LINES/PAGE,
W=PAGE WIDTH     M=0,L=58,W=132
PAGE HEADING? (Y/N) Y
ENTER PAGE HEADING: Inventory Shortages List
DOUBLE SPACE REPORT? (Y/N) N
ARE TOTALS REQUIRED? (Y/N) N
COL     WIDTH,CONTENTS
001     20,PART
ENTER HEADING: <Part
002     40,DESCRIBE
ENTER HEADING: <Description
003     10,LOCATION
ENTER HEADING: <Location
004     8,STOCK
ENTER HEADING: <Stock
005     8,BKORDER
ENTER HEADING: <Back ord
006     8,COST
ENTER HEADING: <Cost
007     8,PRICE
ENTER HEADING: <Price
008 <RETURN>
```

Take a look at the fourth listing to see how this is saved. By making the first character in the heading a lesser than sign, you tell dBASE to place the report label at the left edge of that column.

The fifth case will calculate the total value of the inventory both by cost and by price. To do so, dBASE will have to pass through the data file and multiply the current quantity of a part by its cost and put this value into the TOTCOST field we have cleverly prepared. When this has been accomplished it will pass through again and do the same for the TOTPRICE field. Then we'll use another report format called INVCOST to list out the proper fields and have the proper fields totaled. Look at the first listing to see what fields will be printed.

The sixth case is the simplest report of all. Here we need only list out the total inventory list. We use yet another report format to accomplish this task, INVLIST. This is shown in the sixth listing.

The listing will appear in order of the part number. If we wanted another sort, the easiest way to do it would be to create another index file and tell dBASE to

USE *filename* INDEX *indexname*

The next listing, INVSTART.CMD, shows this being done.

INVSTART.CMD, the second listing, is a way to get around a ticklish problem. It is called from the main menu only when the data file is not found. It prompts the user to create the data file exactly as it is required from within the program. When the user has completed the structure, dBASE then indexes the file by the part number and places the index in a file named PARTNUMB. When this program has completed it will return to wherever it was when it was called, namely, the next line in the INVMENU.CMD listing.

The third listing is INVMENU.FMT, which we discussed at length earlier.

Program continues next page.

```
? "*****************************************************************"
? "*                                                               *"
? "*     INVENTORY SYSTEM IN DBASE II FOR COMPUTING NOW!           *"
? "*     (C) 1984 CHRIS VANDERSLUIS                                *"
? "*              4730 QUEEN MARY RD. #12                          *"
? "*              MONTREAL, QUEBEC, H3W 1W8                        *"
? "*              (514) 341-3203                                   *"
? "*                                                               *"
? "*****************************************************************"
?
?
? "THIS MODULE WILL ASSIST YOU IN CREATING THE DATA FILE"
? "NECESSARY FOR THE INVENTORY SYSTEM."
?
? "YOU WILL BE SHOWN WHAT TO ENTER."
? "ENTER IT EXACTLY AS SHOWN."
? "          ======="
?
? "HIT ANY KEY TO CONTINUE..."
WAIT
ERASE
? "ENTER RECORD STRUCTURE AS FOLLOWS:"
? " FIELD    NAME,TYPE,DECIMAL PLACES"
? " 001      PART,C,20"
? " 002      DESCRIBE,C,40"
? " 003      STOCK,N,8"
? " 004      BKORDER,N,8"
? " 005      SHORTAGE,N,8"
? " 006      MINIMUM,N,8"
? " 007      LOCATION,C,10"
? " 008      COST,N,8,2"
? " 009      PRICE,N,8,2"
? " 010      TOTCOST,N,8,2"
? " 011      TOTPRICE,N,8,2"
? " 012 <RETURN>
? "INPUT DATA NOW?N"
?
CREATE INVDATA
USE INVDATA
INDEX ON PART TO PARTNUMB
```

INVSTART.CMD

```
M=0,L=58,W=132
Y
Inventory Shortages List
N
N
20,PART
<Part
40,DESCRIBE
<Describe
10,LOCATION
<Location
8,COST
<Cost
8,STOCK
<Stock
8,BKORDER
<Back-ord
8,SHORTAGE
<Shortage
```

INVSHORT.FRM

INVMENU. CMD

```
*************************************************************
*                                                           *
*    INVENTORY SYSTEM ON DBASE II FOR COMPUTING NOW!        *
*    FILE INVMENU.CMD                                       *
*    (C) 1984 CHRIS VANDERSLUIS                             *
*             4730 Queen Mary Rd. #12                       *
*             Montreal, Quebec, H3W 1W8                     *
*             (514) 341-3203                                *
*                                                           *
*************************************************************

* Set up the parameters required for the program
SET DEFAULT TO B
SET TALK OFF
SET INTENSITY ON
SET FORMAT TO SCREEN
SET EXACT ON

* Set up the GEMINI 10X printer for condensed mode
SET PRINT ON
? CHR(15)
SET PRINT OFF

* Look for data file
* If it is not there, then branch to INVSTART.CMD
IF .NOT. FILE ('INVDATA.DBF')
  DO INVSTART
ENDIF

STORE " " TO choose

* Use the proper data file and use the index by part number
USE INVDATA INDEX PARTNUMB

DO WHILE t

  SET FORMAT TO INVMENU
  READ

  SET FORMAT TO SCREEN

  DO CASE

* Enter stock section
    CASE choose = "1"

    STORE " " TO continue

    DO WHILE continue <> "N"

      ERASE
      ACCEPT "ENTER PART NUMBER ==>" TO search

      FIND &search

      STORE 0 TO receive
      STORE 0 TO back

      IF # = 0

        ?
        ? "That number is not on file.  Do you wish to add it"
        ACCEPT "to the Master Part List (Y/N)? " TO addit

* Add new part to master file
        IF addit = "Y"
          CLEAR GETS
          APPEND BLANK
          REPLACE PART WITH SEARCH
          ERASE

* EDIT.FMT
@  0, 5 SAY "+============================================================+"
@  1, 5 SAY "!                        Edit Master File                    !"
@  2, 5 SAY "+============================================================+"
@  3, 5 SAY "!                                                            !"
@  4, 5 SAY "!    Part number: ["
@  4,24 GET part
@  4,45 SAY "]                    !"
@  5, 5 SAY "!                                                            !"
@  6, 5 SAY "!    Description: ["
@  6,24 GET describe
@  6,65 SAY "]  !"
@  7, 5 SAY "!                                                            !"
@  8, 5 SAY "!    Location: ["
@  8,21 GET location
@  8,32 SAY "]                                  !"
@  9, 5 SAY "!                                                            !"
@ 10, 5 SAY "!    Cost: ["
@ 10,17 GET cost
@ 10,30 SAY "]         Price: ["
@ 10,48 GET price
@ 10,60 SAY "]       !"
@ 11, 5 SAY "!                                                            !"
@ 12, 5 SAY "!    Minimum number required     ["
@ 12,39 GET minimum
@ 12,52 SAY "]               !"
@ 13, 5 SAY "!                                                            !"
@ 14, 5 SAY "!    Current number in stock     ["
@ 14,39 GET stock
@ 14,52 SAY "]               !"
@ 15, 5 SAY "!                                                            !"
@ 16, 5 SAY "!    Current number backordered  ["
@ 16,39 GET bkorder
@ 16,52 SAY "]               !"
@ 17, 5 SAY "!                                                            !"
@ 18, 5 SAY "+============================================================+"

          READ



          ENDIF
        ELSE
          CLEAR GETS
          ERASE

* ENTER.FMT
@  0, 5 SAY "+============================================================+"
@  1, 5 SAY "!                          Enter Stock                       !"
@  2, 5 SAY "+============================================================+"
@  3, 5 SAY "!                                                            !"
@  4, 5 SAY "!    Part number: ["
@  4,24 SAY part
@  4,45 SAY "]                    !"
@  5, 5 SAY "!                                                            !"
@  6, 5 SAY "!    Description: ["
@  6,24 SAY describe
@  6,65 SAY "]  !"
@  7, 5 SAY "!                                                            !"
@  8, 5 SAY "!    Location: ["
@  8,21 SAY location
@  8,32 SAY "]                                  !"
@  9, 5 SAY "!                                                            !"
@ 10, 5 SAY "!    Cost: ["
@ 10,17 SAY cost
@ 10,30 SAY "]         Price: ["
@ 10,48 SAY price
@ 10,60 SAY "]       !"
@ 11, 5 SAY "!                                                            !"
@ 12, 5 SAY "!    Minimum number required     ["
@ 12,39 SAY minimum
@ 12,52 SAY "]               !"
@ 13, 5 SAY "!                                                            !"
@ 14, 5 SAY "!    Current number in stock     ["
@ 14,39 SAY stock
@ 14,52 SAY "]               !"
@ 15, 5 SAY "!                                                            !"
@ 16, 5 SAY "!    Current number backordered  ["
@ 16,39 SAY bkorder
@ 16,52 SAY "]               !"
@ 17, 5 SAY "!                                                            !"
@ 18, 5 SAY "!         Enter number received:    ["
@ 18,42 GET receive
@ 18,56 SAY "]           !"
@ 19, 5 SAY "!                                                            !"
@ 20, 5 SAY "!         Enter number backordered: ["
@ 20,42 GET back
@ 20,56 SAY "]           !"
@ 21, 5 SAY "!                                                            !"
@ 22, 5 SAY "+============================================================+"

          READ

          REPLACE stock WITH stock + receive
          REPLACE bkorder WITH bkorder - receive
```

```
        IF bkorder < 0
          REPLACE bkorder WITH 0
        ENDIF
        REPLACE bkorder WITH bkorder + back

      ENDIF

      ERASE
      ACCEPT "Do you wish to continue(Y/N)? "TO continue

    ENDDO
    RELEASE search, continue, receive, back

* sell stock
    CASE choose = "2"

    STORE " " TO continue

    DO WHILE continue <> "N"

      ERASE
      ACCEPT "Enter part number to be sold ==>" TO search

      FIND &search

      IF # = 0

        ? CHR(7)
        ? CHR(7)
        ?
        ? "That part number is not on file."
        ?
        STORE 0 TO xx
        DO WHILE xx < 35
          STORE xx + 1 TO xx
        ENDDO WHILE xx < 35

      ELSE

        STORE " " TO correct

        DO WHILE correct <> "Y"
          STORE 0 TO sold
          CLEAR GETS
          ERASE

* SOLD.FMT
@  0, 5 SAY "+============================================================+"
@  1, 5 SAY "!                          Sell  Stock                       !"
@  2, 5 SAY "+============================================================+"
@  3, 5 SAY "!                                                            !"
@  4, 5 SAY "!    Part number: ["
@  4,24 SAY part
@  4,45 SAY "]                      !"
@  5, 5 SAY "!                                                            !"



    STORE " " TO pack
    DO WHILE answer <> "Q"
      STORE "? CHR(7), CHR(7)" TO beep
      GOTO TOP
      ERASE
      CLEAR GETS
      STORE ' 'TO answer
      ?'*** DISPLAY RECORDS ***'
      ?
      ?'Enter part number or <Q>uit'
      ?
      ACCEPT to search
      STORE !(search) to search

      IF search <> "Q"

        FIND &search

        IF #=0
          &beep
          ? "That part number is not on file"
          STORE 1 to xx
          DO WHILE xx<35
            STORE xx+1 to xx
          ENDDO WHILE xx<35
        ELSE
          ERASE

* EDIT.FMT
@  0, 5 SAY "+============================================================+"
@  1, 5 SAY "!                        Edit Master File                    !"
@  2, 5 SAY "+============================================================+"
@  3, 5 SAY "!                                                            !"
@  4, 5 SAY "!    Part number: ["
@  4,24 GET part
@  4,45 SAY "]                      !"
@  5, 5 SAY "!                                                            !"
@  6, 5 SAY "!    Description: ["
@  6,24 GET describe
@  6,65 SAY "]  !"
@  7, 5 SAY "!                                                            !"
@  8, 5 SAY "!    Location: ["
@  8,21 GET location
@  8,32 SAY "]                                  !"
@  9, 5 SAY "!                                                            !"
@ 10, 5 SAY "!    Cost: ["
@ 10,17 GET cost
@ 10,30 SAY "]         Price: ["
@ 10,48 GET price
@ 10,60 SAY "]       !"
@ 11, 5 SAY "!                                                            !"
@ 12, 5 SAY "!    Minimum number required     ["
@ 12,39 GET minimum
@ 12,52 SAY "]               !"
@ 13, 5 SAY "!                                                            !"
@  6, 5 SAY "!    Description: ["
@  6,24 SAY describe
@  6,65 SAY "]  !"
@  7, 5 SAY "!                                                            !"
@  8, 5 SAY "!    Location: ["
@  8,21 SAY location
@  8,32 SAY "]                                  !"
@  9, 5 SAY "!                                                            !"
@ 10, 5 SAY "!    Cost: ["
@ 10,17 SAY cost
@ 10,30 SAY "]         Price: ["
@ 10,48 SAY price
@ 10,60 SAY "]       !"
@ 11, 5 SAY "!                                                            !"
@ 12, 5 SAY "!    Minimum number required     ["
@ 12,39 SAY minimum
@ 12,52 SAY "]               !"
@ 13, 5 SAY "!                                                            !"
@ 14, 5 SAY "!    Current number in stock     ["
@ 14,39 SAY stock
@ 14,52 SAY "]               !"
@ 15, 5 SAY "!                                                            !"
@ 16, 5 SAY "!    Current number backordered  ["
@ 16,39 SAY bkorder
@ 16,52 SAY "]               !"
@ 17, 5 SAY "!                                                            !"
@ 18, 5 SAY "!         Enter number sold: ["
@ 18,35 GET sold
@ 18,50 SAY "]                !"
@ 19, 5 SAY "!                                                            !"
@ 20, 5 SAY "!         Is this correct (Y-N)?"
@ 20,37 GET correct
@ 20,68 SAY "!"
@ 21, 5 SAY "!                                                            !"
@ 22, 5 SAY "+============================================================+"

          READ

        ENDDO

        REPLACE stock WITH stock - sold

      ENDIF

      ERASE
      ACCEPT "Do you wish to continue(Y/N)?" TO continue

    ENDDO

    RELEASE sold, continue, correct

* Edit master file section
    CASE choose = "3"

    STORE " " TO answer



@ 14, 5 SAY "!    Current number in stock     ["
@ 14,39 GET stock
@ 14,52 SAY "]               !"
@ 15, 5 SAY "!                                                            !"
@ 16, 5 SAY "!    Current number backordered  ["
@ 16,39 GET bkorder
@ 16,52 SAY "]               !"
@ 17, 5 SAY "!                                                            !"
@ 18, 5 SAY "+============================================================+"
        ?
        ?'<E>dit,    <D>elete, <R>ecall'
        ?'<F>orward, <B>ackward, <Q>uit'
        ACCEPT TO answer
        STORE !(answer) to answer
        DO CASE
          CASE answer='E'
          READ
          CASE answer='D'
        DELETE
          STORE "Y" TO pack
          ?
          ?'** Record deleted **'
          STORE 1 to xx
          DO WHILE xx<35
            STORE xx+1 to xx
          ENDDO WHILE xx<35
          CASE answer='R'
          RECALL
          STORE "Y" TO pack
          ?
          ?'** Record recalled **'
          STORE 1 to xx
          DO WHILE xx<35
            STORE xx+1 to xx
          ENDDO WHILE xx<35
          CASE answer='F'
          STORE # to prevrec
          SKIP
          IF #=prevrec
            &beep
            ?'** Record not found **'
            STORE 1 to xx
            DO WHILE xx<35
              STORE xx+1 to xx
            ENDDO while xx<35
          ENDIF
          CASE answer='B'
          STORE # to prevrec
          SKIP -1
          IF #=prevrec
            &beep
            ?'** Record not found **'
            STORE 1 to xx
            DO WHILE xx<35
              STORE xx+1 to xx
```

```
            ENDDO WHILE xx<35
          ENDIF
          CASE answer='Q'
          &beep
        OTHERWISE
          &beep
          ?'** Invalid Entry **'
          STORE 1 to xx
          DO WHILE xx<35
            STORE xx+1 to xx
          ENDDO WHILE xx<35
        ENDCASE

      ENDIF #=0

    ELSE
      STORE "Q" to answer

    ENDIF search <> "Q"

  ENDDO while answer <> "Q"

  IF pack = "Y"
    PACK
  ENDIF

*Report of shortages in the stock
  CASE choose = "4"
  GOTO TOP
  ERASE
  ? "Now calculating the shortages. This may take a"
  ? "couple of minutes.  The Shortages Report shows"
  ? "how many of a part number are either not in stock"
  ? "or not back-ordered in order to have the minimum"
  ? "stock required."
  REPLACE ALL shortage WITH minimum - (stock + bkorder)
  REPORT FORM INVSHORT TO PRINT FOR shortage > 0

* Report of the total cost and retail value of the stock
  CASE choose = "5"
  GOTO TOP
  ERASE
  ? "Now calculating the total cost and retail value"
  ? "of the inventory.  This may take a couple of minutes"
  REPLACE ALL totcost WITH cost * stock
  REPLACE ALL totprice WITH price * stock
  REPORT FORM INVCOST TO PRINT

* Report of the total inventory list
  CASE choose = "6"
  REPORT FORM INVLIST TO PRINT

* Leave the program and dBase and return to the operating system
  CASE choose = "7"
  SET TALK ON
    QUIT

  ENDCASE
ENDDO WHILE t
```

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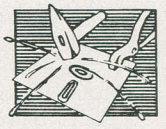

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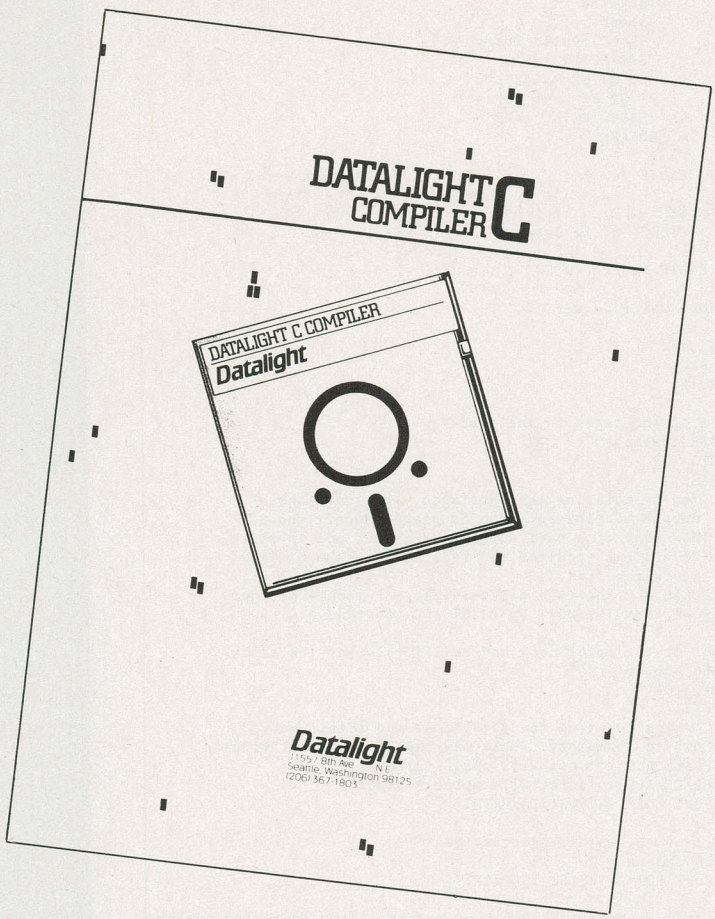
The Datalight C Review

If all the C compilers in the world were stacked one on top of another you could climb into the sky and shoot down low satellites with a cross bow. Despite the obvious utility of such an application, this compiler deserves better use.

by Steve Rimmer



The unfortunate part about choosing a C compiler for the IBM PC is that one usually does so when one is first getting into C, and is, as such, about as poorly equipped to do so as one is likely to get. They all sound pretty much the same when one first stumbles over them... it's only a bit later, when one has played with the compiler of one's choice for a while that one frequently starts wishing for a good, easily transportable time warp program.

The companies which make C compilers frequently publish advertisements which show charts of the execution times of benchmark programs and code density and so on. While these things are important, they are not the sole reasons for buying one compiler over another. In many cases, the characteristics one may be after are ones which the boys who devise the ads rarely bother talking about.

In addition, while compilers are usually optimized for worthwhile things, like speed or code density, I've run across several which I'm pretty sure were solely optimized for running benchmarks.

The Datalight C compiler package is a relatively obscure little troll. It lacks the loyal followings of the larger packages, such as Lattice C or Microsoft C. It also lacks some of the facilities of these implementations of C. However, it offers a number of things for many C programmers which make it worth checking out. Not the least of these is its rather modest price, about a fifth of what most of the larger compilers go for.

Traveling Light

Datalight C shows up on two floppies with a surprisingly skinny manual... a soft bound magazine size effort of about seventy-five pages. As it turns out, the second disk is wholly unnecessary for most programming applications... it contains source files for some sample programs and some bits of the library... we'll get back to that momentarily.

The rather diminutive size of Datalight C, as opposed to, say, Lattice, has one immediate consequence for potential users with floppy based systems. Unless you are planning to write an inordinately huge program with the compiler, you'll find that you can squeeze the compiler and its library, the Microsoft linker, which is required for the operation of the whole circus, any reasonable sized editor... WordStar and its overlays will suffice... and the other sundry files one needs all on two floppies. One can, as such, edit, compile and link programs without having to swap disks at all.

This arguably godlike feature is meaningless, of course, if you have a hard disk.

The second thing which one finds out about in using Datalight C is that it's a really speedy compile. In fact, it knows this, and boasts about it every time it gets something done. The final status line of each pass of the compiler tells you the code and data sizes of whatever you've just created and then the time it took to get it all together... down to the nearest hundredth of a second. Small utility programs will compile in five or six seconds for each of the two passes. Fairly large things... resulting in fifteen or twenty kilobytes of object code... may take as long as a minute on the first pass. By comparison, one of the larger assembly language programs I've written, which generated about sixteen kilobytes of object code, assembled in just under six minutes.

In practice, these splendid numbers don't tell the whole tale. They don't take into account the time it takes to boot the compiler's two halves... small but noticeable... and, more important, they cause one to forget the time it takes LINK and EXE2BIN to do their things. The linking time usually exceeds the compile time by about a factor of five.

One of the things which one can do to make the compiler run quite a bit faster is to create a RAM disk for it and make it direct all its temporary and intermediate files there. In a normal compilation, the first pass of the compiler will read the source file from a real disk and the EXE2BIN will write the final COM file to one. Everything else can be done in RAM. Of course, you'd need a fair bit of RAM to make this practical... pro-

bably at least a quarter of a megabyte for programs of a reasonable size. However, memory's a lot cheaper than a hard disk.

The fact that Datalight C does use the Microsoft linker, however, does speak to one of its more powerful features. One can use Datalight C code as modules of other programs written in other languages... so long as they, too, are compatible with the linker. One can also link various other things into Datalight C, most notably assembly language code. As such, with only moderate sweat, one can write new bits to add to the effective library of Datalight C if one finds need to.

The extremely fast compilation offered by the package does make it a bit of a party to write code under. One typically creates a batch file to invoke the compiler which will check for the ERRORLEVEL batch value after each pass. The compiler sets it if there are source code errors in the file it's given to ingest. As such, the thing will only proceed to the next pass if nothing is amiss in the first.

While the end of the compilation process can be a bit lengthy, the beginning... which is where all one's typos show up... clips along like a frog on an oil slick. As such, one can spot a program's problems almost immediately, upon which time the whole procedure will give up and return to DOS, allowing one to invoke one's editor and try again.

The error messages one comes across in Datalight C are pretty decent. There is a good variety of them, so one not only knows where the offending lines are but also why in particular they're offensive.

There are a few limitations inherent in the Datalight C package and, in fairness, if you are planning to write gargantuan programs with it these may get in your way. The maximum size of the code it can generate is sixty-four kilobytes. There is also a sixty-four kilobyte limit on the size of its data and, if you want to EXE2BIN its results into a COM file... a worthwhile undertaking... both the code and the data must fit into sixty-four K.

As I said, it's only a serious hangup if you are planning to write something truly excessive. For the rest of us, it's one of the factors which contributes to Datalight C being capable of fast compiles and pretty tight object code.

The Secret Library

A C compiler is not much better than the library which comes with it. The library contains the routines that make up C... it's what the compiler sets up calls into to make your programs run. The library, to a large extent, determines the speed of the compiler and the richness of the language one has to work with.

The library which comes with Datalight C is much smaller than that of the really heavy C compilers. It has less stuff in it, to be sure, and, as such, Datalight C lacks many of the slicker features of, say, Lattice C. However, it is a complete implementation of C as described in Kernighan and Ritchie. The bits one doesn't find in it are things that have been added to other compilers by their authors.

These aforementioned bits are, of course, awfully nice to have, and do make programming some sorts of applications under Lattice a lot easier than they are under Datalight. However, they also limit the portability of one's code... assuming one uses them... if one attempts to port it to a system with a compiler which doesn't support them.

One can use Datalight C code as modules of other programs written in other languages...

The library of Datalight C is sufficient to handle pretty well anything one could throw at it... you may have to write small functions to do some of the things that Lattice C would do for you right out of the can. However, the smaller library of Datalight C is one of the reasons it compiles so quickly and keeps one's programs down to a manageable hugeness... a reasonable trade off, depending upon exactly what you plan to write.

There are a few other restrictions in the Datalight library. Principal among these is its affinity for DOS two or better... it doesn't even want to look at DOS one, and programs which use disk file access will cough under lesser DOS's and return you to their prompts. One can see why the author of the compiler chose to handle things this way... DOS two's disk file calls handle things almost exactly the way C does, and, as such, the library code needed to implement them is minimal.

There are a number of functions in Datalight C which aren't in the least bit portable, but are designed to give one direct access to the innards of the IBM PC. There are, for example, *bdos*(f,DX) which execute an INT 21H call into DOS, returning an *int* value corresponding to AL. In a more comprehensive sense, there are *int86* and *intdos*, which handle interrupt calls completely under program control. They communicate through structs which contain the values of the AX,BX,CX,DX,SI and DI registers. Sadly, they don't pass the flags register too, which is kind of essential to be able to use many of the DOS two calls. A drag, this.

There is also a function, *system*, which allows one to execute shell commands to DOS.

One of the interesting things that the compiler does is to optimize the size of one's code by eliminating bits of it that shouldn't really be there. For example, it will compact expressions at compile time, as in

```
gotoxy(10,top+5);
```

The function *gotoxy(x,y)* is one I've written... it positions the cursor on the screen at location *(x,y)* through an *int86*. If *top* is a constant set up in a *#define* somewhere... we'll say that it has a value of two... the second argument in this call will always be seven. The compiler will actually store this as seven, not the sum of two values, which would have to be summed each time the program was run.

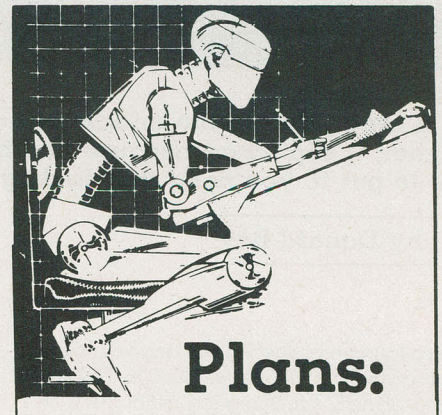
There are a number of things like this which it gets into.

Down to the C

Datalight C is not the most powerful C compiler for the IBM PC but, depending on what you're looking to do with it, it could well be the best. Its small size makes it manageable and fast. Its library is adequate and its system specific facilities are well in keeping with the capacities of the PC itself. Even its manual, thin though it may be, turns out to be lucid and eminently practical.

It's also extremely inexpensive.

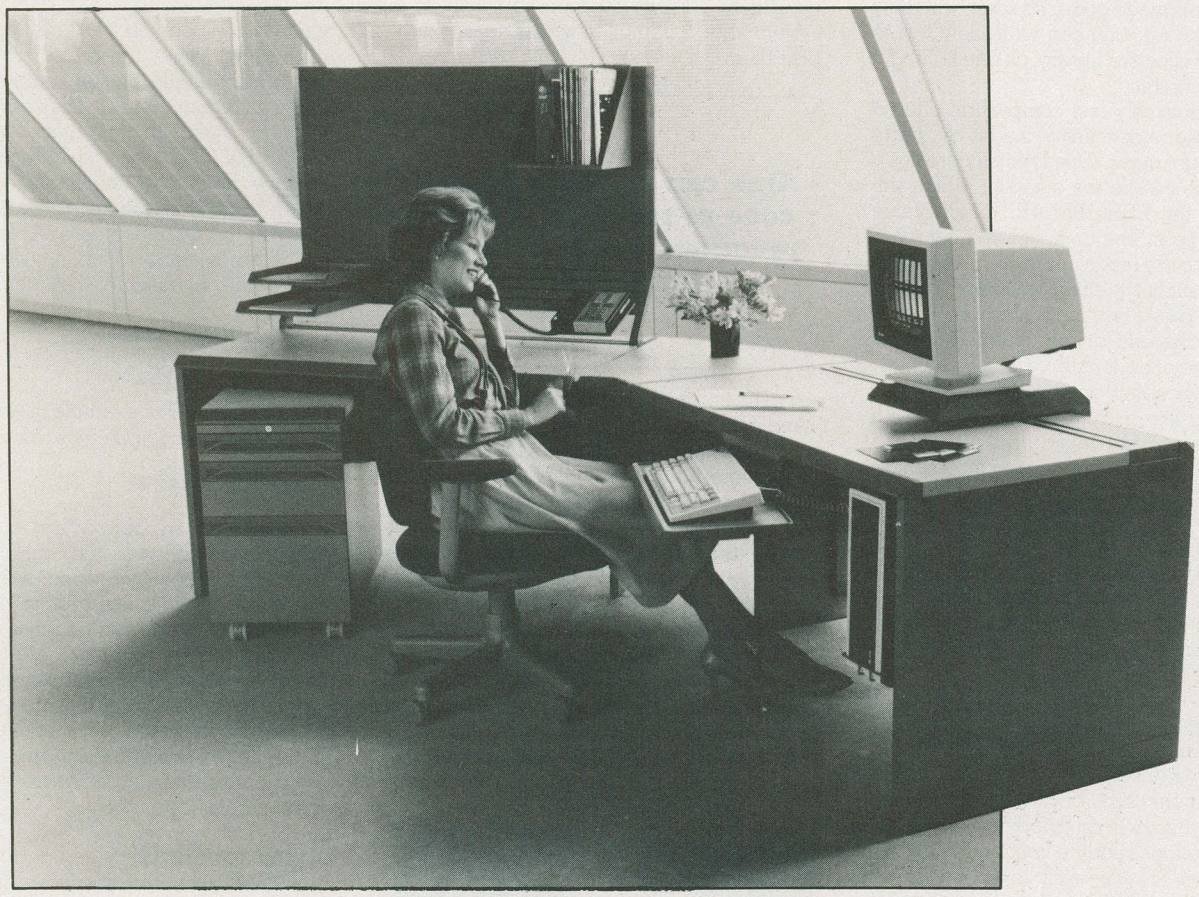
Datalight C is a particularly impressive value. While I wouldn't want to wholly abandon my copy of Lattice C in its favour... each has its strengths... there are some things that it's ideally suited for. **SN!**



Plans:

Software:	**Datalight C Compiler**
System:	**IBM PC**
Manufacturer:	**Datalight, 11557 8th Avenue NorthEast, Seattle, Washington 98125, (206) 367-1803.**
Available from:	**Software Commodities, 465 King Street East, Toronto, Ontario M5A 1L6, (416) 865-1600.**
Price:	**$79.00**

The Ready! Review



If you've ever had a great idea in the middle of doing something else, and seen it slip away because you had no place convenient to put it, you need this package.

by Donald Roy

Sloppy writing and sloppy programming have the same consequences. While the essential idea may be the greatest thing since the beginning of the free world, exactly how it is developed into its final form will have a gross effect on the success or failure of the finished product. As a writer's tool, outline processors assist the creative process, providing a means of developing a structure for the task at hand. Properly used, they allow a sound framework to be embellished into a work of literary art. This emphasis on structure is also found useful when working with certain programming languages, such as Pascal, C and dBASE. Outlining the major parts of a program, followed by ever greater amounts of detailed code, is the key concept in developing structured language skills.

Following the success of *ThinkTank*, a stand alone outline processor, Living Videotext has released *Ready!* for public consumption. Retaining many of the key features of its older brother, *Ready!* is entirely memory resident, which keeps it handily tucked away until it's needed. While some sacrifices had to be made to gain this utility, the program is a highly useful, low cost addition to any writer's or programmer's software stable.

RAM Page

Designing a memory resident application is, in theory, a fairly simple matter. Three basic code segments are needed. First, one needs full access to the BIOS keyboard functions. This will allow constant checking of the status of various keys and whether a key has been struck without removing it from the

keyboard buffer. Routines like this are used to detect the "hot key" sequence that wakes up a memory resident application. You might want to check the "PC Notepad" article in this edition of Computing Now! for a practical example of how this process works.

The second need for programs of this variety, is a good set of interrupt control routines. An initializing procedure is required to establish the service routine with a particular interrupt type. From that point forward, when the specified interrupt occurs, the procedure is executed. When the routine is to be terminated, another code segment is used to restore the original destination of the interrupt.

Lastly, one needs to be able to design the useful procedures, which are the ultimate point of doing all this in the first place, and tuck them away in memory. Generally, all this work is done in assembly language, to provide the needed control of stacks and to ensure that the program will remain resident after termination. Some of the needed information can be found through peeking around the bytes in low memory, but in general, the whole affair is more easily handled with a low level language. Putting these three concepts together results in a slick way to load a utility at boot time and then be able to jump into it, from within another application.

Ready! uses these broad ideas to put much of the ability of ThinkTank into a resident mode. Used in combination with a word processor or editor, *Ready!* allows headings, ideas and concepts to be laid down without initial consideration of the most suitable structural arrangement. Headings can be expanded and details collapsed, the order of concepts can be rapidly revised, all without resorting to awkward control sequences. When the time arrives to become more concerned with the actual appearance of text or source code, *Ready!* outlines can be transferred into an editor for processing.

From the hardware point of view, the package requires that you have an IBM PC or compatible computer with at least a hundred and twenty-eight kilobytes of memory available to dedicate to it. In fact, as any memory that's used by applications is on top of this, a minimum practical configuration would call for at least a quarter megabyte... and more if you use a spreadsheet. Default configurations can be set to support standard monochrome and colour display cards, as well as the Hercules card and the IBM Enhanced Graphics Adapter. If you have a mouse bolted to your hardware, input from this can also be accommodated. A separate version of the main program file is included to enable use with the expanded memory boards from Intel and AST Research. *Ready!* is not copy protected, so it can be stored on a hard disk and loaded as part of an AUTOEXEC file.

Outlines as large as thirty-two kilobytes can be created, edited, stored and retrieved from disk files under *Ready!*. If memory is a problem, this amount can be reduced to half, freeing up some of the reserved space. The program gets along quite well with any application that runs only in text mode, but packages that run in graphics mode, like FrameWork, will demand some adjustment of the *Ready!* default file to keep it from disrupting their screens.

When *Ready!* is first loaded, it displays a short message that specifies the amount of memory in the machine, the amount used and that which is available for other tasks. A reminder of the *control 5* call sign is also shown. From this point, any other program can be run normally.

Given the ever present possibility of conflict with other memory resident packages, such as Sidekick, *Ready!* has been designed to live just above the resident portion of DOS. This means that it can be easily used with other denizens that insist on being loaded after all others... and will pack up and go away if they're not. I checked *Ready!* with about a half dozen of these and found few problems. A keyboard reassignment routine from *Smart Key 5.0* did prevent *Ready!* from waking up, even though the hot keys had not been reassigned. This is a typical response for a program, resident or not, that processes its own keyboard interrupts. A READ.ME file on the program disk points out this problem as the source of incompatibilities with the Xywrite II+ and Samna III word processors.

Should the need arise to clear the program out of memory, there is an unload command available from the main menu. If other resident applications were installed after *Ready!*, its space will not be freed by unload until all other residents are also unloaded, or DOS is restarted with a warm boot.

The program documentation is a soft bound booklet, written by Adam Green, the noted dBASE expert and columnist. Leading off with a tutorial fashion "day in the life of *Ready!*", the hundred plus page manual presents the needed information in a light, but slightly condescending style. With so many new computer owners around, it surely must be a challenge to keep everyone happy. Information of a more technical variety is restricted to appendices in the back and current *ThinkTank* users can refer to a short section that highlights the differences between the two products. A quick reference card is also included with the program.

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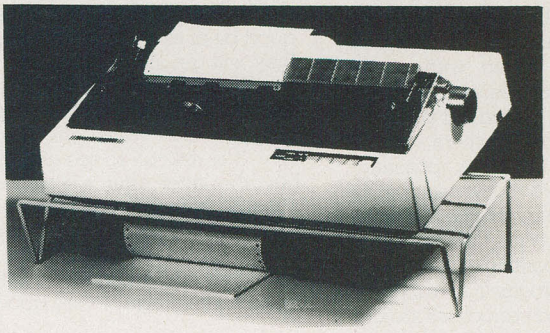

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Putting it to Work

In operation, *Ready!* uses the bottom four lines of the screen as the command menu area. Full use is made of the function keys, often as alternates to selection of commands from the menus. Main and secondary menus, as well as a function key menu can be called up. Their general workings are similar to the Lotus menu, where entries can be made by moving a highlighted box and pressing enter to select it, or by simply pressing the first letter of the option.

A series of cursor movement keys is available, using the number pad buttons. For those who find pressing the left arrow to move up one headline a bit odd, there is also a WordStar compatible mode that uses the diamond pattern of control keys to navigate among the lines. This mode can be toggled on and off with an alternate F4 combination.

Outlines are built with major headings to the left and subheadings move to the right as the level of detail increases. New headings are started by pressing the insert key and headlines must be edited in a separate text mode. A minor annoyance appears as, on returning to the main application from *Ready!*, the state of the insert key is carried back to the application. This happens with WordStar and might occur with other programs that use the insert key as a toggle.

As the size of the outline builds, the level of visible detail in any particular section can be collapsed by placing the cursor on a line having subheadings and pressing the minus key on the number pad. Pressing the plus key will restore collapsed lines, or an asterisk can be used to expand all subheading levels in one stroke. A function called "hoisting" can be invoked to collapse all headings above the current one, useful for concentrating on a particular section of text.

Ready! files are stored to disk with an .RDY file extension that is assigned by the program. Subdirectory support is provided, along with the ability to move into a directory and use files from that area only. Edited files can be saved to the same or a different name, abandoned or saved with editing continued. Pressing the escape key will back you out of errant command paths.

Outlines, or portions of them, can be transferred from *Ready!* into other application programs. Selecting the *setup* command from the second level menu presents a choice of destination programs. Over thirty popular word processors, spreadsheets, programming languages, database and integrated programs are supported on the distribution disk and instructions are provided in the manual for creating special transfer parameter files if need be. Porting text to another program is as easy as highlighting the desired headline, returning to the application and pressing control alternate 5. The headline, along with any subheadings associated with it, will appear where the cursor is currently positioned. Entire outlines can be transferred by placing the *Ready!* cursor on the home headline.

Many other features are available to manipulate outlines. These include sorting subheadings alphabetically, searching for keywords and access to DOS date and time functions. Commands may be repeated by hitting a number key prior to the letter calling the command. Function keys five through eight are reserved for autoloading outline files called F5, F6 and so on. Several outline files are included on the main disk, including daily scheduling templates, lists of control codes for Epson printers, state capitals with time zones and area codes. The purpose of these is to demonstrate that *Ready!* can also be used as an on line reference guide to the general information you want to keep handy.

If you have a suitable modem... Hayes compatible, of course... the program can also be used as an autodialer. Highlighting a headline that contains a telephone number will cause that number to be sent out to the modem, with instructions to pick up the handset when dialing is complete. Provision is made to have suitable pauses inserted in the process, if you are calling through a switchboard that demands you dial nine and wait to get an outside line.

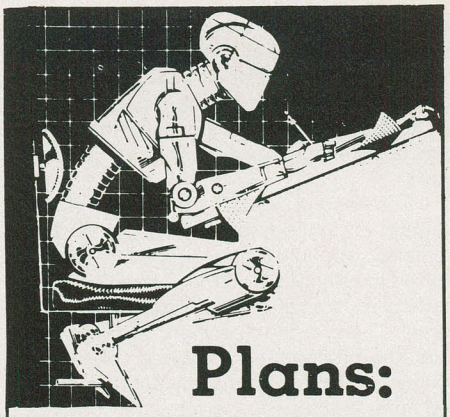
Outlines as large as thirty-two kilobytes can be created, edited, stored and retrieved from disk files under Ready!

The Wrap

If you're concerned that your ideas follow a concise, logical flow in the presentation of information, or if you use structured programming languages, *Ready!* will be found a useful package. Its strongest point is that it remains memory resident, which far outweighs the thirty-two kilobyte size limit of files that can be created.

The approach to allocating memory, so that other resident programs can also be used, is clever and successful. This is important, since it does not pretend to replace works like SideKick and others. In fact, a good bit of effort has gone into ensuring that they will get along famously.

While Living Videotext goes to some length in the documents to explain how this program and *ThinkTank* are complementary, it is difficult to see why anyone would buy the latter after seeing *Ready!*. If you already have *ThinkTank*, there may be some justification in considering the change over. The modest asking price, lack of copy protection and interface to other programs make it a package of very good value.



Plans:

Software:	**Ready! outline processor**
System:	**IBM PC or compatible, DOS 2 or higher, 128K memory plus sufficient for main applications.**
Manufacturer:	**Living Videotext, Inc., 2432 Charleston Road, Mountain View, California 94043, (415) 964-6300**
Availability:	**Computer Book and Supply Centre, 1263 Bay Street, Toronto, Ontario M5R 2C1, (416) 926-0064**
Price:	**$145.00**

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New from Norton

The Norton Utilities is one of the things that make one's PC a better place to exist. This is the latest crop.

by Donald Roy

For thousands of PC users, the name Peter Norton is synonymous with salvation. While the novice DOS user can accidentally erase a disk file... or a few... through lack of experience, even the most seasoned among us can periodically achieve the same result when countless hours in front of the screen lead to just the shortest moment of inattention.

The legendary *Norton Utilities* is a collection of file management, data recovery and disk exploration tools that allow users of almost any level of experience to work productively within the deepest confines of DOS. Most famously known for the UnErase utility, which allows for the reconstruction of deleted files, the *Utilities* contain far more than this single purpose in life. The most recent release, version 3.10, includes a number of new tools as well as improvements on some old favourites.

Also recently unleashed from the inner sanctum of Norton's operations is *The Norton Editor*. This text editor is billed as the one Norton wishes he had when first writing the utilities. Offering a collection of both word processing and programmer oriented features, this package has been released with a modest selling price that any serious programmer cannot afford to ignore.

Utilitarian

The main program, containing UnErase, is NU.COM which provides much more for learning about your disk's habits and behaviour. The menu selection for "Exploring Disk Information" provides a wealth of tidbits that will make you a hit at the next party when someone brags about having bought a new Commodore. From this selection, you can obtain a graphic map of exactly how the disk space has been allocated, or if you are feeling particularly brave, you can edit the contents of any sector directly. A report of technical information about the currently active disk can be provided, among many other things. Much of these should be considered for tinkering only, as one's knowledge of disk layouts and all should be extensive before using the editing functions directly. Throughout the entire disk, several toggles or switches are available to adjust the program to your liking.

If the *UnErase* facility appears to justify the collection's asking price, then the balance of the additional programs on the *Utilities* disk will come for free. This collection includes a sorting routine for your disk directory, a disk test routine that checks for damage to either a file or the entire disk, another that will display and give you control over the file attributes... whether they are hidden, system, read only or archive files... along with a file size command that will show the space occupied by files of the "hidden" and "system" variety.

Hard disk users will appreciate the file find utility that will locate a file by searching through all available directories. As well, a list directories file will output the names of all directories and sub-directories on the disk. An unremove directory command allows deleted directories to be recovered so that their former contents can also be revitalized. Other programs provide interesting system information, can report elapsed time like a stopwatch, do a search of files for the occur-

rence of a specific string or passage and edit disk volume labels.

Two useful programs for secrecy buffs are the *Wipedisk* and *Wipefile* utilities that can be invoked to ensure that even Norton himself couldn't recover the files. These procedures invoke United States government specifications to ensure that old data is totally overwritten... in fact, a number of times.

Version 3.10 of the *Utilities* brings two new programs to light... the *Quick UnErase* and *Unremove Directory* utilities mentioned before. Improvements to previous programs include much improved facility in handling hard disk directories and paths, support for the Bernoulli Box hard disk, as well as modes to handle European and mainframe format data. Upgrades are available to registered owners of previous versions for twenty-five dollars.

The Editor

Programming editors and word processors are two different dresses cut of the same cloth. But just how each is put together determines their utility in different circumstances. Certain features that make a great deal of sense when writing reams of source code will be found totally useless if the job at hand is to draft a manuscript. The *Norton Editor* is only the second product to be released from Norton's group and represents a venture into a field in which competition is fierce. With the *Utilities* representing over twenty thousand lines of source, one would believe that the *Editor* encodes a great deal of experience.

In fact, this work is a bit of a strange beast. Since programmers still have to write some documentation for their efforts, a good number of classical word processing features are included. Paragraph reformatting, search and replace, split screen editing of two files and word wrap can be found useful for the task of producing documents. The *Norton Editor* is entirely RAM resident, meaning that it is extremely fast. The size of document that can be handled is limited only by available memory and those that are larger are efficiently handled by cacheing.

All the needed block commands and cursor movement options are provided, as well as filing options. Some of the programmer's background shows through in noting that *The Norton Editor* maintains three levels of backup files. The handling of simultaneous editing of two documents is well done, with the ability to cut and paste between the two open files.

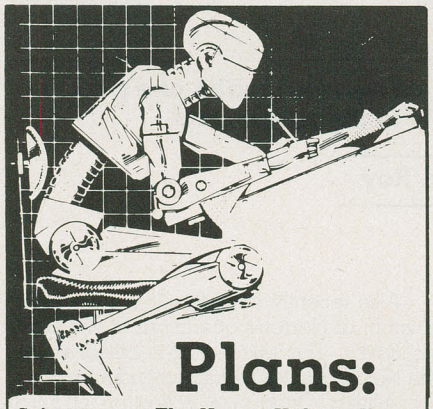
Included features that will be found useful when writing pages of C, Pascal or assembler code are automatic indenting on line changes, virtually unlimited line length and a "collapse" mode that hides all lines except those having a character placed in column one of any line. This outlining facility, seen in other programs, is highly advantageous in a structured programming environment. A status command can be called through the F2 key and provides vital statistics about things like the input and output filenames, current format settings and the vacancy rate in the edit buffer, as well as the logged disk.

A full DOS interface is provided through the F9 key, allowing direct entry of commands from within the program. On line help screens can be called from the F1 key and an *undelete* feature keeps second thoughts from turning sour. Mouse support is included for the Microsoft and Mouse Systems optical species, or any other compatibles.

Perhaps in trying to be too many things for too many people, this package leaves some gaps... with the result that it is stellar at neither application. For instance, there is no way to directly edit the IBM PC extended character set... an ability that appears in such diverse packages as XYwrite II+, PC-Write and Brief. All the editing commands are to be accessed through the function keys, with no alternates available.

Another minor annoyance is that the program will boot directly into a request for the filename to be edited if one has not been specified at startup. A file directory cannot be called before a document has been chosen for editing. When picking up an editing task on a disk that has several files, it would be quite nice to be able to see them before choosing one.

In spite of these criticisms, *The Norton Editor* is packed with features and well worth its price.



Plans:

Software:	**The Norton Utilities Version 3.10**
System:	**IBM PC or compatible, PC or MS-DOS 2, 128K memory and one disk drive.**
Manufacturer:	**Peter Norton, 2210 Wilshire Blvd. #186, Santa Monica, California 90403 (213) 826-8032**
Availability:	**Compuserve, 400 Alden Rd., Markham, Ontario L3R 4C1 (416) 477-8088**
Price:	**$162.00 (US)**
Software:	**The Norton Editor**
System:	**IBM PC or compatible, PC or MS-DOS 2**
	Not available from Compuserve
Price:	**$50.00 (US)**

CN!

Publisher's Statement

The following four pages, not including the Software Catalogue, are not editorial but neither are they straight advertising.

As a magazine we were faced with a conflict of interest. We made a conscious decision some months ago that reviewing IBM compatibles had been overdone. Most of the companies making these make a virtue of how similar their's run to an IBM. As they nearly all do, it is tough to know what new information there is to tell the reader.

The BEST computers, in common with many other IBM compatibles, are excellent, yet we were not prepared to make an exception for them.

The following pages are independent reviews but their inclusion is not editorial since the pages are sponsored by the manufacturer.

The editorial and production staff of Computing Now! have not been involved in the preparation of these pages in any way.

HW Moorshead

Halvor Moorshead
Publisher, Computing Now!

Working with the BEST

By Dick O'Brien, Controller — City of Etobicoke

AN ARTICLE like this is not only out of my normal realm, it's one I wouldn't even attempt if it wasn't for my faith in what I consider to be a great Canadian product.

A few years ago, when most people I knew thought that computers were room-sized monsters that would *take over* and prove that Orwell was right, I was one of those brave souls who purchased a 64K CP/M machine to help manage some of my business affairs and political lists and to help me learn what computers were all about. I became fluent enough in CP/M to get done what I wanted most of the time, and was very comfortable with my own computer.

When that old CP/M machine decided to curl up and die, trashing a number of my disks along the way, I knew I couldn't get along without a computer, but I had a bigger decision to make. Should I stay with CP/M or plunge into this thing called DOS that I was hearing so much about? Of course all this was happening just before election time...and all my election lists were on my dearly departed CP/M machine's strangely formatted — and partially trashed — disks. I had to act quickly, and was convinced by friends and colleagues that I should enter the world of MS-DOS. I was still skeptical. I was used to CP/M. I'd been using high-density disks (with 1208k on each) for a long time: how would I manage with 360K floppies? Then my friends told me a hard disk was the answer. So I started to look into it and found that there was no way I could afford any big-name MS-DOS machines.

Having been an avid reader of Computing Now! for some time, I discovered the BEST line of computers, and was pleased to find out that they are made in Canada — in fact, right in the City of Etobicoke. I found that I could actually *afford* a BEST Mark II with a hard disk and that it could do everything I wanted. So I bought one! Arrangements were made to have as much of the data on my CP/M disks salvaged as possible and transferred to the MS-DOS format.

The BEST people think that a micro should come with everything you need to really use it. This includes serial and parallel ports, a built-in clock and calendar with battery backup, plenty of expansion slots (7 in all — 4 free with the hard disk installed) and IBM-compatible colour card. I was able to drive my old composite video Zenith monitor from the colour card with no problems at all.

Some of the Virtues

I was impressed by the clean design under the flip-up case. Everything looks orderly and functional; the workmanship appears to be very good. It's nice to see a Made-in-Canada machine that is carefully put together.

The BEST Mark II saves slots by combining the clock, parallel and serial ports on the floppy controller. This arrangement seems to work just fine. All of the 640K RAM sits on the motherboard, so no extra slots are required to load up the memory. When it comes time to use those extra slots, the 150 watt power supply should have no problem coping with extra boards.

Exceltronix makes a variety of add-on cards; I quickly added their parallel/game adapter. The game card gave me a place to attach my joystick, as well as an extra parallel port for my letter quality printer. At first there was a problem with not being able to print with either of my printers. It turned out that both ports were configured as LPT1, so they were conflicting with each other. With a quick check of the documentation I found that all that was required was to place a jumper over two pins on the floppy controller to re-configure the original parallel port to LPT2. Problem solved.

The documentation for the entire system, while thin, seems to contain all the details for setting jumpers, configuring the machine for memory, number of drives etc. and setting up the real-time clock. I really didn't have to worry too much about the switches though, since they had all been properly set at the factory.

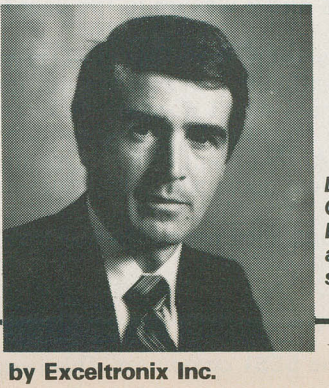
Upon startup, the BEST's Phoenix BIOS runs a self-test that includes two checks of the RAM on board. By striking any key, the self-test can be aborted. This is a great time-saver when you want to get at something right away, and can't face waiting for 640K of RAM to be checked. Another feature that IBM left out is the front panel reset switch. This allows you to do a cold re-boot without powering down the machine. As for IBM compatibility in general, I have only heard of one educational game-type program that won't run on the BEST. I've been told, however, that no other compatible can run that program for some reason. Every other program I've thrown at it seems to work fine.

After about a week, I began to get some data errors from the Shugart floppy drive. At the same time, I felt that the Seagate 20 megabyte hard disk was making a peculiar sound. I brought the machine to the Exceltronix head office in Etobicoke and while I waited, they replaced both the floppy drive and the hard disk for me. I doubt that I could have received better service at any other computer outlet.

Just as I became familiar with MS-DOS, the BEST was put into virtually round-the-clock service for five weeks in my election campaign. It performed flawlessly.

Now that I can use all the good IBM-compatible software that's available, I've started to use my computer on a daily basis for file management, downloading files from bulletin boards, and especially for budgeting and financial forecasting. To speed up the number-crunching in particular, I know that my next machine will be the Mark III. It has an 8088-2 processor that you can run at either the standard 4.77 MHz or at the much faster rate of 8 MHz. With the success I've had with my Mark II, and from what I've seen running on a friend's Mark III, I can't wait to get my hand on one.

With all the talk lately about Canadians being unable to compete in high-technology products, it's really refreshing to see a line of well-designed, well-built Canadian products that disproves those arguments, at prices that are competitive — and I enjoy telling people that I own the BEST.



Dick O'Brien, is a Controller, City of Etobicoke and has owned a BEST computer for some time.

Independent Reviews of the BEST computers. This page sponsored by Exceltronix Inc.

A Look at BEST Computers

By Dan Mersich, a Toronto Lawyer

Dan Mersich is a Toronto based lawyer whose practice is restricted exclusively to computer related matters. He is the author of "EDP and Law" a regularly appearing column in a leading industry journal and site on the editorial board of the REVIEW INTERNATIONAL OF COMPUTER TECHNOLOGY AND LAW. His experience in the EDP industry dates back to the mid 1960's.

WHEN BEST COMPUTER Corp. introduced its BEST computer in the last quarter of 1983, few people would have predicted that this Canadian fledgling would become the countries largest independent personal computer manufacturer.

How did they manage to achieve this stature, how will they maintain it, and what is the next step? These questions can all be answered by taking a look at the BEST line of computers and seeing why the competition has taken a back seat.

BEST Computer Corp presently has four models; the Mark II, Mark III, Mark IV and AVT-286. All the machines offer full IBM compatibility, higher speed and are made right here in Canada. After talking with a few of the key personnel at the company we found that these professional products were the result of long hours and hard work. They said they are unique in the sense that very few companies actually design, manufacture and retail computers in Canada. Apparent ly some competitors buy foreign boards, stuff them with chips then slap the *Made in Canada* label on their product. BEST feel that this is not Canadian made, nor is it a wise practice. Not enough control over design and manufacturing were the reasons given for not going the route of their competitors. They say that design was the key since they could customize and supply a new product virtually over night, something nobody else could do. This is the reason they have products like the Mark IV, a true 16-bit machine that is an IBM PC compatible that even IBM doesn't have! To see why this passion for quality and design control is so great, we should delve into the company's past.

The original BEST computer was developed during the summer of 1983 and brought to market late that same year. The machine was a redesign of the original IBM PC. At that time several other companies had developed similar machines with similar ideas in mind: to produce an affordable IBM PC compatible. This marketing strategy had its precedent set during the cloning of the Apple. Several factors, however, indicated that this was inappropriate for this class of personal computers.

Marketing analysts' views varied greatly, but most agreed on the following:

1. At $2,000 - $3,000 for a compatible and $5,000 - $6,000 (remember this was in 1984!) for the IBM PC, they could not longer be viewed as toys for the home as were the Apples, Commodores, Atari's, etc.

2. Any machine produced by IBM will be taken by the public to be a business machine, regardless of what IBM may tell us. This is the probable cause of the demise of the PCjr. (but this is another story).

3. IBM was actively prosecuting infringers of its copyrighted BIOS. This fact alone resulted in machines being sold without a BIOS and it was up to the user to supply the EPROMS.

This was flavour of market by mid-1984: most companies were in financial difficulty, sales were not improving, and most customers didn't want to even consider a machine in which big blue IBM may be suing over BIOS infringements. At this point BEST Computer Corp. made major strategical decisions concerning its computer line.

The decisions, although they seem obvious now, were extremely risky then. Decisions were made to acquire a proven legal BIOS; to improve the corporate image of BEST Computers and to improve and expand their personal computer line.

By October of 1984, most of the mechanisms were in place; the Phoenix BIOS had been purchased and a new line of computers was planned, the Mark II, the Mark III, Mark IV and the Mark V (later to be known as the AVT-286). The consequences of each move was carefully thought out.

The acquisition of the Phoenix BIOS was a major step since it allowed the machine to be sold legally with a compatible BIOS. Perhaps an explanation why Phoenix BIOS is legal is in order. Phoenix Software Associates saw an emerging force in the small computer industry: IBM. They predicted that if IBM entered the market they would eventually become the standard. Because of this they felt there would be a need for other companies (like BEST) to enter the market with a compatible, yet legal bios. They proceeded to analyze the BIOS by defining each call and subroutine. They then recruited some software people who signed a legal document indicating they had never seen or known of the IBM BIOS specifics. After the BIOS was written, Phoenix engaged a major insurance company to insure them against legal suits. This last action actually served two purposes, the obvious protections, as well as invoking confidence in prospective buyers.

Armed now with a legal BIOS, BEST sales increased dramatically. The BIOS not only gave the machine a solid software foundation but gave it what the industry calls added on value. This phrase is used to describe those features which are above and beyond the *de facto* standard. Some of these features include a faster boot-up procedure, a key-click from the speaker every time a key is pressed with volume control, and intelligent handling of unexpected software interrupts, NMI and parity checks. These features alone put BEST computers above the rest. However more was required if the company was really to take hold in the market place.

The BEST Mk III

The introduction of the Mark III late in 1984 gave that necessary boost. Because of the success of the addition of the Phoenix bios, it was clear that most cus-

Moorshead Publications

SOFTWARE CATALOGUE

SPRING 1986

Moorshead Publications Software, 1300 Don Mills Rd., Don Mills, Toronto, Ont. M3B 3M8

Moorshead Publications

About Almost Free Software:

For many, Public Domain software is one of the most exciting and rewarding aspects of microcomputing. Each year, thousands of programs are created by private individuals and distributed through computer bulletin boards systems. Magazines such as Computing Now!, Computers In Education and Electronics Today, have also contributed to the body of public domain software by publishing program source code listings.

Public Domain software is *free*, but locating, retrieving and debugging the software can be a time consuming endeavor. The programs offered in this Catalogue have been culled from bulletin board systems through out Canada and the United States. Most have been chosen for their high quality and their usefulness, although a few have been included because they are just plain fun!

In this Catalogue you'll find outstanding software for MS-DOS, PC-DOS, CP/M, Apple DOS and Macintosh systems. Whether you're looking for utilities, business/productivity software, or games, we bring you the best of what the public domain has to offer.

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Lobo Max-80 512 (SSDD)
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Wang Maws CP/M (DSDD)
Xerox 820 II (SSDD)

Note: Unless otherwise stated, all software listed in this catalog and distributed by Moorshead Publications has been obtained through public access bulletin boards and is believed to be in the public domain. A number of programs distributed on these disks are classed as 'freeware' and contain requests for registration fees. Note that payment of such fees is entirely optional, but users who do register may be eligible for program enhancements and technical support.

All software distributed through this catalogue is offered free of charge. Prices listed for these disks serve only to defray the costs of the diskettes, postage and handling.

Moorshead Publications warrants that the software will be readable. If defects in the medium prevent this, we will replace your disk at no cost. While we have made every effort to assure that these programs are completely debugged, we are unable to assist you in adapting them for your applications.

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Almost Free PC Software

Moorshead Publications

Volume I.

PC-Write While not quite WordStar for nothing, this package comes extremely close to equalling the power of commercial word processors costing several hundred dollars. With full screen editing, sophisticated cursor movement, PC-Write also boasts features such as user-definable help screens and a 'printer ruler file' which can be customized to work with virtually any printer.

```
===PC-TALK III  COMMAND SUMMARY===

↑PrtSc =  print screen contents
^PrtSc =  contin. printout (or ^PgUp)
 Alt-R =  Receive a file  (or PgDn)
 Alt-T =  Transmit a file  (or PgUp)
transmit: pacing '=p'  binary '=b'
tran/recv: XMODEM '=x'
 Alt-V =  View file   Alt-Y = delete
 Alt-D =  Dialing directory
 Alt-Q =  redial last number
 Alt-K =  set/clear Func keys (Alt-J)
 Alt-=    set/clear temp Alt keys
Alt-E = Echo toggle  Alt-M = Message
Alt-S = Screendump   Alt-C = Clearsc
 Alt-P =  communications Parameters
 Alt-F =  set program deFaults
 Alt-L =  change Logged drive
 Alt-W =  set margin Width alarm
 Alt-Z =  elapsed time/current call
 Alt-X =  eXit to DOS
Ctrl-End = send sustained Break signal
```

SOLFE is a small BASIC program that plays baroque music. While it has little practical use, it's a lot of fun. It's also a fabulous tutorial on how to use BASICA's sound statements.

PC-TALK Telecommunications packages for the IBM PC are typically intricate, powerful and huge. This one is no exception. It has menus for everything and allows full control of all parameters, even the really silly ones. It does file transfers in both ASCII dump and MODEM7/X-MODEM protocols. And, it comes with a comprehensive documentation file which uses 119424 bytes of disk space.

SD This sorted directory produces displays which are a lot more readable that those spewed out by typing DIR.

FORTH This is a small FORTH, written in Microsoft BASIC. It's good if you want to get used to the ideas and concepts of FORTH. You can build on the primitives integral with the language.

LIFE This is an implementation of the classic ecology game written in 8088 assembler code. While you may grow tired of watching the cells chewing on each other, the source code provides a good example of how to write assembler applications.

MAGDALEN This is another BASIC music program. We couldn't decide which of the two we liked better, so we wound up putting both of them on the disk.

CASHACC is a fairly sophisticated cash acquisition and limited accounting package written in BASIC. It isn't exactly BPI, but its a lot less expensive and suitable for use in many small business applications.

DATAFILE is a simple data base manager, written in Microsoft BASIC.

UNWS WordStar has an unusual propensity for setting the high order bits on some of the characters in the files it creates. Here's a utility to strip the bits and 'un-WordStar' the text. The assembler source code is also provided.

HOST2 This program includes BASIC source and documentation files to allow users with SmartModems to access their PC's remotely.

Only $19.95

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Volume II.

Almost Free PC Software

SWEEP is a disk utility which virtually replaces the DOS COPY command. It allows one to do mass copying, deletions, renaming and other disk operations in menu-driven comfort.

WORLDMAP is a sophisticated graphics program which draws a very detailed map of the world. It can display its wares on the tube, or send them out to a dot-matrix printer.

ANITRA plays Anitra's Dance by Edvard Grieg. A beautiful addition to your computer music collection.

RAMDISK is one of the most useful utilities you'll ever plug into your PC. Once installed, it creates a virtual drive in memory on your PC. Files can be copied to the RAM-disk and accessed in less time than real drives take to turn on their LEDs.

ALLEN pays a bizarre adventure game and will lead you into some of the most exotic spots in the universe. It comes with a massive data file for an adventure that you won't get tired of 'til the dragons come home for the evening.

FOS is a well designed personal finance manager which will do much to help you tame your cheque books.

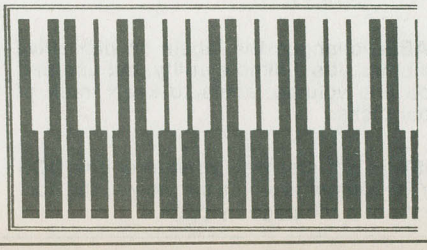
JUKEBOX represents yet another PC music system. This one come with a host of songs to play and some really electric graphics.

ASMGEN is one of the best text disassemblers we've come across. It takes any executable COM or EXE file and produces an assembler listing. It's surprisingly good at distinguishing between code and embedded data or text.

```
        POPULAR                  N

A -- Downtown                E -- Cab
B -- Garota de Ipanema       F -- Imp
C -- Satisfaction            G -- Ret
D -- Sounds of Silence       H -- Sun

===> SELECTION:  D <===
```



STRUCT will appeal to the rabid programmer in everyone. It enables MASM to be used to assemble a higher level language. Included also is a test file to illustrate the syntax.

PRTSC replaces the internal PC screen dump code with something more suited to reality. It allows one to hit the PrtSc* key and then select the print quality from a menu. It supports a number of popular printers.

BREAKOUT plays a PC version of the popular game. It will accept input from either a joystick or the keyboard. The graphics are good and the action is adjustable from a beginner's level right up to 'fast and nasty'.

UTIL is a collection of system utilities which can be accessed from a single menu. Among its many talents are a sorted directory, keyboard redefinition and the facility for scrolling up and down through a text file.

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Almost Free PC Software

Volume III.

FIXWS is a simple utility which modifies WordStar files so that they can be used by programs which work with ordinary ASCII files.

WRT DOS 2.0 allows for each file to have a 'read only' flag, but it lacks a way of manipulating them. This pair of utilities allows you to set and unset this flag, protecting important files from accidental erasure.

BROWSE is a timesaving program which provides a useful alternative to the DOS 'TYPE' command. BROWSE allows you to easily scroll up and down through text files, saving you the effort of running your word processor just to get a quick look at a text file.

CAT If the DIR display is too dull for your tastes, CAT may be just what you need. It will tell you everything you could possibly want to know about the files on your disks.

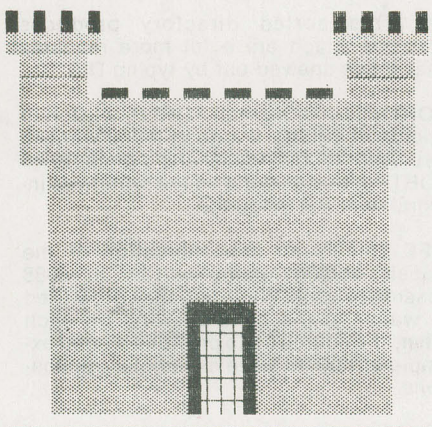
CGCLOCK is a simple little program which displays the running time in the upper right hand corner of your screen. In addition, the program has lots of display options and works with the colour graphics card.

CURSOR A tiny twenty-four byte program which displays a large cursor on your monitor.

CMP This program does a very elaborate comparison of two files and reports their differences. It can for example, spot corrupted files and may prove useful when dealing with files created by redirection.

JUMPJOE A bit like "Miner 2049'er", this game is certain to damage your mind. You get to be the janitor of a space station and must deal with berserk robots and other weirdness. It's a hoot!

CASTLE Wander through a deserted castle collecting treasures... but mind you don't get killed by the nasties. A solution is included should frustration set in.



78INT This is a small BASIC program to calculate interest using the rule of seventy-eight.

MOON is one of the nicest lunar lander games we've come across. This version uses high resolution graphics and startling sound effects to hurl you to your doom in style.

PERTCHT is a BASIC program which prints PERT charts. It should interest anyone involved in project management and scheduling.

DATNOIDS is one of the strangest games ever put on a disk. In fact, mere words don't serve to describe it: you'll have to try it for yourself.

NUK-NY This is one of the nastiest bits of software we've ever seen. It produces a full color high resolution simulation of a nuclear attack on New York City.

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Volume IV.

Almost Free PC Software

BACKSCROLL Perhaps one of the cleverest DOS utilities, BACKSCROLL hooks itself into the PC and buffers whatever scrolls by. Using a well thought out command structure, it allows one to scroll back and forth through text which would normally have scrolled off the screen into oblivion.

BIGCAL is a BASIC program which performs calculations on extremely large numbers. Using floating point form instead of scientific notation, very accurate calculations can be made.

BUGS is an off the wall ASCII game in which a player uses the cursor pad keys to move a 'nuclear fly swatter' around the screen blowing up a long crawling bug.

CLOCK is a useful tutorial in writing character oriented device drivers for the PC. In addition, the program is an improved replacement CLOCK.SYS file which works with many real time clocks. The ASM file is included.

CRYPTO is a BASIC program which unscrambles cryptograms. It's an interesting study for puzzle enthusiasts.

DEFRAG is a utility that lets you "de-fragment" your disks to make your applications run faster. The utility reorganizes a disk, connecting up the fragments of files created by DOS.

DOSEDIT is one of the most useful DOS utilities available. it enhances the command line facility of MS-DOS by creating a command stack. Instead of merely being able to recall a command with the F3 key, DOSEDIT lets you use the cursor arrow keys to scroll through a whole stack of previously entered commands, re-executing the ones you need.

DUmp is a utility program designed to produce Hex dumps of object files. Useful in its own right, the program also serves as a good example of how to use DOS disk service calls. The ASM file is also included.

FREE is a tiny file which tells you how much space is left on a disk... without having to view an entire directory listing. Its especially handy for hard disk systems.

KBFIX displays the status of the keyboard lock keys on the screen and expands the size of the keyboard character buffer to avoid losing bytes.

LABEL changes the labels on disk drive volumes. It's a simple utility, but useful if you use volume labels to keep track of your disks.

LIST is an improved version of the DOS TYPE command which shows you the contents of a file page by page.

MEMBRAIN is the most sophisticated RAM disk program we've seen yet. It lets users install variable sided disks and provides control over several other parameters.

MONOCLOK is a screen clock display program, designed specifically to work with monochrome displays.

MOVE is a disk utility which moves and optionally erases disk files. Using wild cards, the user can ensure that specific types of files are not MOVED by the program.

NEWBELL is a tiny program which performs the lowly task of changing the sound of the PC's control G beep.

NUSQ is a file un-squeezer. Its a useful utility for people who download compressed files form bulletin board systems.

PARCHK is a trap which prevents the system from 'freezing' when a "parity error" is encountered. It gives you the option of finding out what caused the error and recovering from it.

PURGEDUP is an intelligent little program which cleans up obsolete backup files. Very useful on a hard drive.

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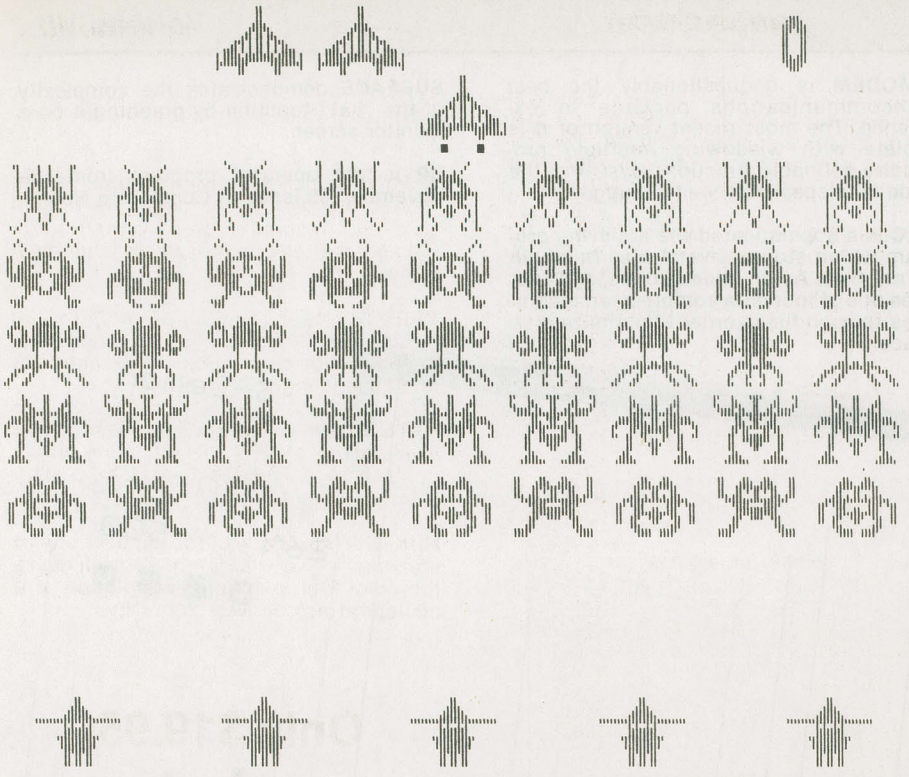


SPACE INVADERS A fast variation of this popular arcade game. the graphics are superb.

SPEED is a simple program which changes some of the PC's floppy disk parameters and effectively speeds up disk accesses for some applications.

VDEL is a multiple deletion program that queries the user prior to erasing each entry. Similar to MOVE, but much smaller.

WHEREIS will locate a file on a disk even if it lurks in a subdirectory. Most useful on hard disk systems.

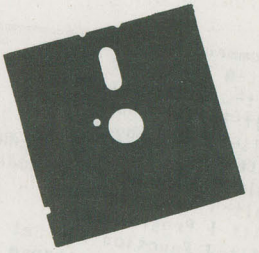
PX is a cross reference generator for assembler programs. It helps you keep track of where you put procedures in large files.

QS is a DOS patch which eliminates some of the wait encountered when DOS is booted while it performs a number of system checks. The program is not compatible with all software, but is still handy to have.

SDIR is an improved sorted directory program.

SP is a clever print spooler which lets you 'print' files into a RAM buffer. The PC then sends the file to the printer at its leisure, leaving the user free to move on to other tasks using the computer.

WIZARDS is an adventure game in the classic style, except that it ranks as one of the most sarcastic programs in creation. The program is vast... you can wander about its darkened corridors for hours.



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Volume V. — *Almost Free PC Software*

AREACODE is a useful tool if you use the telephone a lot. Give it an area code and it will match it with the city in which the code is used.

D is another sorted directory program. This one emulates the CP/M style D, which is arguably more useful for most applications.

FRACTALS An amazing implementation of the Mandlebrot Microscope, which generates unearthly images on your screen.

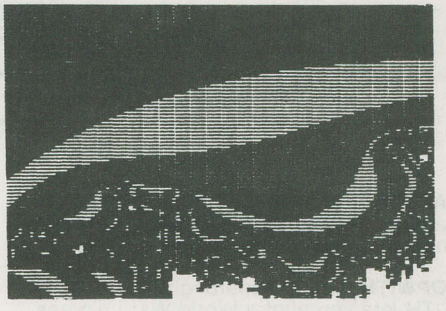
HIDE is a set of utilities which let you create, enter and remove invisible DOS directories. This allows you to set up a hard drive system with secure areas which can only be used by people who know about them.

MORERAM This is an assembler program. You need MASM and LINK to make it work. It lets you alter the memory setting on the PC's motherboard to enable it to use more than 640K RAM. It will even let you set the switch settings to 64K to speed up disk boots and then change the RAM setting after bootup.

MORTGAGE generates amortization charts.

LAR is a library utility that allows you to concatenate several small files into a library to save on disk overhead. Individual files can be extracted as they are needed.

MAIL1 is a mailing label utility written in BASIC.



MXSET lets you control the parameters of Epson printers form the DOS command line. It's a lot easier than LPRINTing characters from BASIC every time you want to change print modes.

NUSQ unsqueezes files that have been previously compressed to save space. Should be of primary interest to bulletin board users.

PARCHK is an assembler program which requires MASM and LINK to work. It installs a trap for parity errors in your computer. A vital aid to help locate suspect RAM chips.

VDEL is a Delete with Verify program. You could type VDEL *.BAK and it would show the name of every .BAK file in the current directory and ask you if you want it deleted.

WHEREIS finds files in a complex hard disk system.

ZAXXONPC This is an incredible implementation of one of the most popular micro games ever created.

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Almost Free PC Software

Volume VI.

3-DEMON is one of the most interesting variations on Pac-Man in the known universe. Instead of simply looking at a map of a maze, this program shows you a three dimensional view of it. You wander through endless corridors, munching food pellets or granola bars... your choice... and avoiding the deadly ghosts.

DU was one of the most powerful CP/M-based disk utilities ever created. This version for the PC captures much of its power and flexibility. It allows you to see what the tracks and sectors on your disks look like, recover erased or damaged files, and meddle with the system tracks.

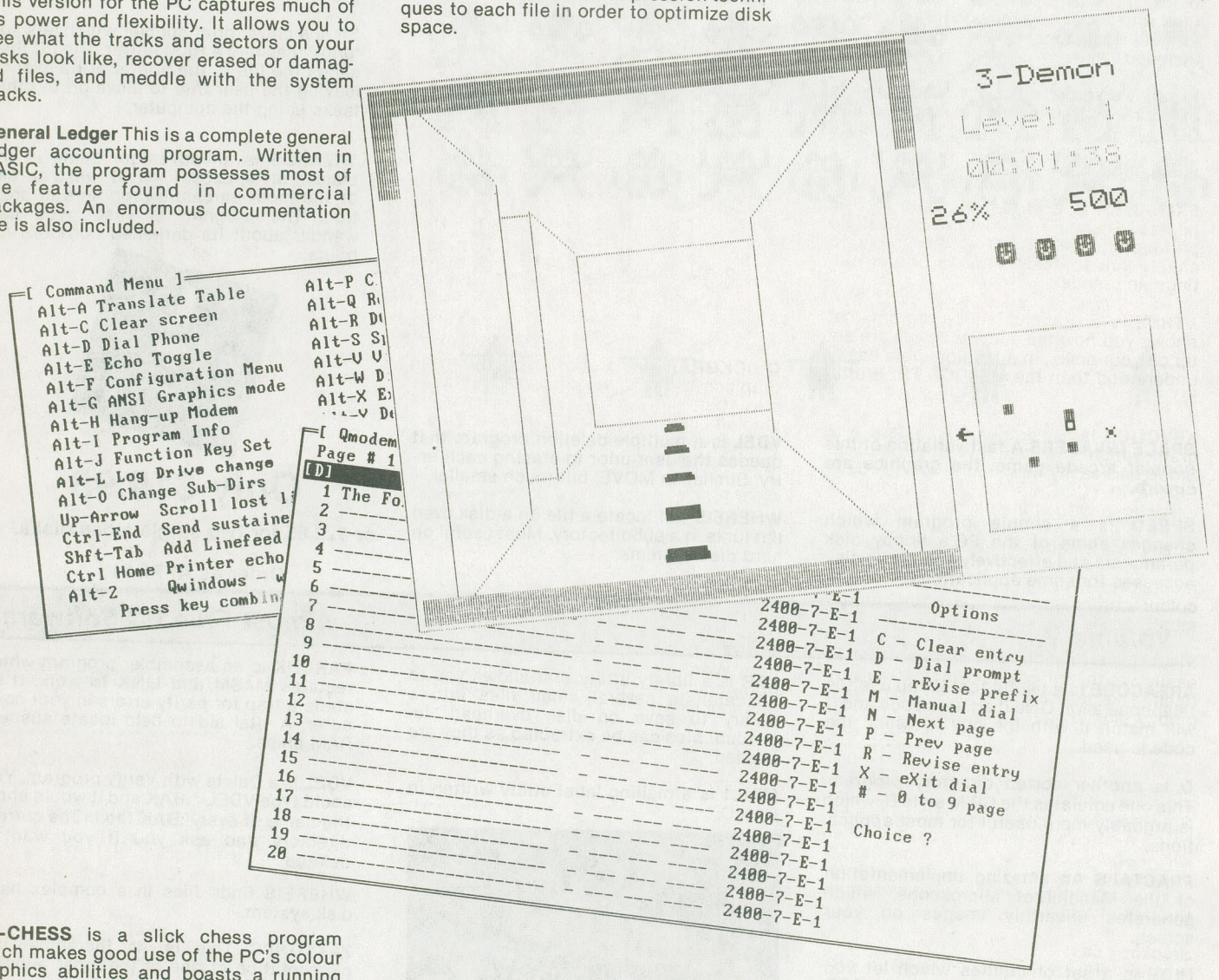
General Ledger This is a complete general ledger accounting program. Written in BASIC, the program possesses most of the feature found in commercial packages. An enormous documentation file is also included.

QMODEM is unquestionably the best telecommunications package in existence. The most recent version of it is replete with windowing, multiple protocols, definable function keys. And the code is unspeakably well debugged.

ARC is a sophisticated file archiving program which stores several files in single library files. As an added bonus, ARC applies one of four data compression techniques to each file in order to optimize disk space.

SURFACE demonstrates the complexity of the "hat" function by graphing it on a monitor screen.

OP is the operator program from the November '85 issue of Computing Now!



PC-CHESS is a slick chess program which makes good use of the PC's colour graphics abilities and boasts a running chess clock.

RAMDISK is the assembler source code for a memory disk program. If you've always wanted to know how these things work, or have a secret desire to write your own variation of this useful utility, here's your chance.

VFILER is a file management utility which lets you view files in a directory and allows you to COPY, TYPE and even run programs... in short, it does almost everything DOS does but it's user-friendly.

ZAPLOAD is a utility for programers to handle Intel standard HEX files. Very fast and well documented.

SOPWITH Using superb graphics, SOPWITH lets you pilot a World War I biplane on dangerous bombing missions.

JSB Another BASIC music program for your collection. This one plays a soothing sonata.

STAR is one of a growing breed of small... somewhat silly... novelty programs. This one, as you might guess, draws stars.

Two Disk Set

Only $24.95

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BLACKJACK is a BASIC implementation of this popular card game. It's both interesting to play and enlightening to dismantle. It can, of course, be easily listed so you can see how it works.

EDSCR is a screen editor which can be used with virtually any programming language from assembler to dBase III. The program lets you 'paint' PC screens with block graphics and saves them as .DAT files which can be easily adapted to work in most languages. An example screen is included.

FK allows you to make the function keys of your PC do more useful things under DOS. They can be redefined to execute commonly used commands and command sequences.

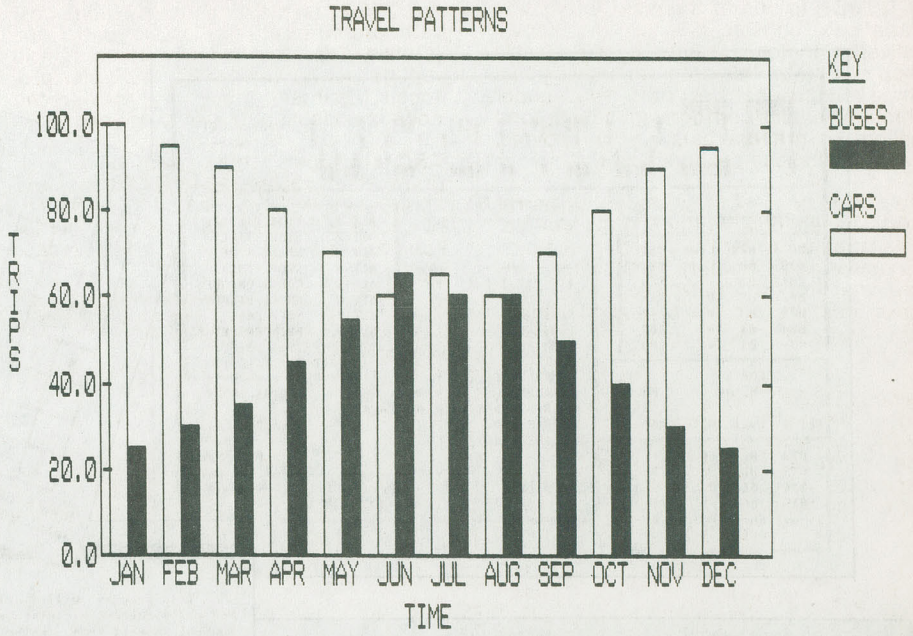
FXMASTER is a printer program for the popular Epson FX Series and compatible printers. It uses a full screen menu to enable you to easily change printer settings and modes.

VTREE is a graphic TREE program that shows you how the subdirectories are set up on your disk... in a fashion more easily understood than the MS-DOS TREE utility.

KEYCLICK is a memory co-resident program which will make your keys click. Small and easily included in an AUTOEXEC file, KEYCLICK solves many problems associated with clone keyboards.

PCBW is a small utility which makes colour screen displays show up in monochrome video. Great for users with colour graphics cards and monochrome monitors.

PINBALL is a pinball simulation that is easily worth the cost of this disk all by itself. The games plays much like a real pinball machine... but its hard to tilt.



QUICKGRAF is a powerful business graphics package which generates complex bar, line and scatter charts in medium and high resolution. An Epson with GrafTrax or compatible printer is necessary to produce hardcopy.

SERPENT is a variation on the classic snake game. Written in BASIC, this one is weird, but very fast.

SHOWCLK is yet another clock program... its the smallest one yet, and it beeps to chime the hour.

INDEX allows you to generate indexes from WordStar documents... or text files from any other text editor. Its an invaluable writer's tool.

WORLD is a remarkable program which incorporates a world map. It allows you to zoom in on specific areas of the globe, locate major cities and perform a number of useful calculation. It also has a feature for tracking hurricanes... tracked any good hurricanes lately?

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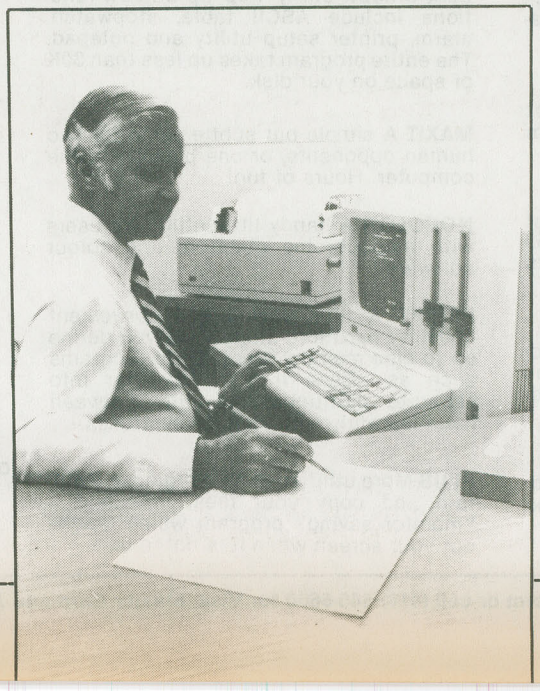
Stockboy Inventory

Stockboy is a good, powerful, flexible bargain-priced inventory package which will handle inventory for most small businesses needs. We use *Stockboy* for our own inventory control and it has stood the test of time.

Stockboy can:

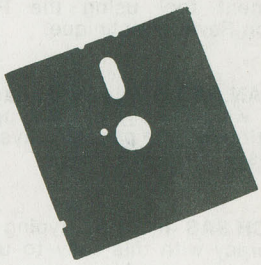
- Maintain an inventory database with current, maximum and minimum stock reporting when an item needs re-ordering.
- Be a point of sale t[e] Generate a customer list to be used in mass mailings.
- Run on any CP/M or MS DOS based computer, including Apple II systems with a Softcard.

Stockboy is written in Microsoft BASIC and is designed to be easily altered to suit your needs. It can be compiled using BASCOM if desired and is designed to be used by nontechnical operators. Available for MS DOS/ PC DOS and many CP/M systems. See order form for a list of available formats.



Also available for CP/M Systems.

See Order form for available formats.



Only $29.95

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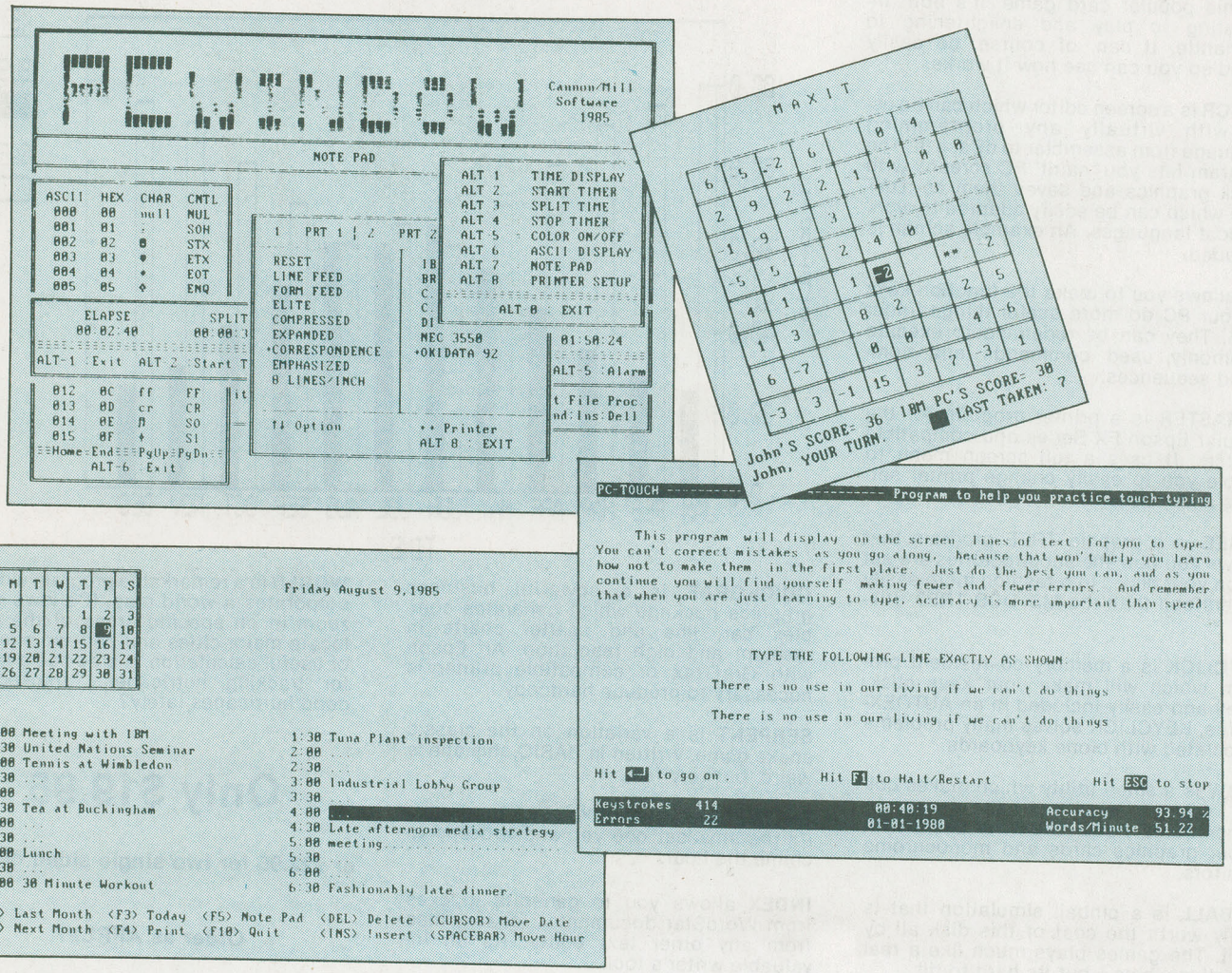
Almost Free Business Software



MA.BAS The Micro Accountant is a complete, working accounting and check register program, with a 25K documentation file.

PERTCHT A sophisticated project management tool using the Program Evaluation Review Technique.

TASKPLAN.BAS Project management software which lets you track up to 50 tasks during 50 time periods (days, weeks or months).

PC-TOUCH.BAS Increase typing speed and accuracy with this easy-to-use typing tutor. Also provides accuracy and speed statistics.

PCYEARBK.EXE Appointments and reminder program to help you keep track of your time.

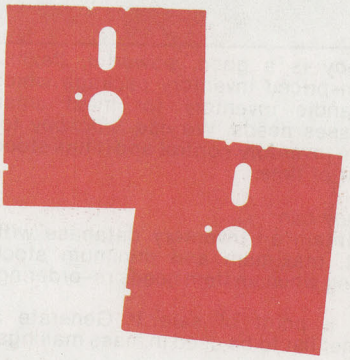
PCWNDW22 A "Sidekick"-like co-resident window utility. Pop-up window functions include ASCII table, stopwatch, alarm, printer setup utility and notepad. The entire program takes up less than 30K of space on your disk.

MAXIT A simple but subtle game for two human opponents, or one player and the computer. Hours of fun!

NOCOLOR A handy little utility for users with monochrome monitors and colour software.

PSHIFT A time saving and convenient 'memory partition' utility. Lets you define up to nine memory areas. Load programs such as dBase II and WordStar into separate partitions and 'flip' between them instantly with simple keystrokes.

PLUS More utilities to help organize maintain and copy your files, including a "monitor saving" program which blanks out your screen when it is not in use.



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or $22.95 for two single sided disks.

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To order use order form or call (416) 445-5600 for Visa, Master Card and American Express orders.

Almost Free CP/M Software

Moorshead Publications

Volume I.

DISK Allows you to COPY, MOVE, DELETE and VIEW files with a simple command structure.

PACMAN You really can play PACMAN without graphics... and it works pretty fast.

FORTH An up-to-date version of FIG FORTH, complete with its own internal DOS.

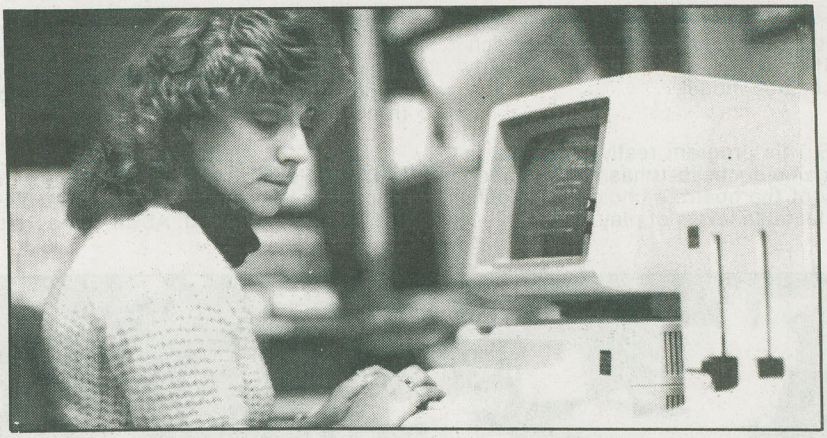
DUU The ultimate disk utility, DUU lets you recover accidentally erased files, fix corrupted files, and modify the system.

D A sorted directory program that tells you how big your files are and how much space is left on the disk.

USQ/SQ Lets you compress and un-compress files. You can pack about 40% more data on a disk with this system.

FINANCE A fairly sophisticated financial package written in easily understandable and modifiable Microsoft BASIC.

BADLIM Ever had to throw out a disk with a single bad sector. BADLIM isolates bad sectors and allocates them to an invisible file, making the rest of the disk useable.



MODEM 7 Allows you to communicate with any CP/M-based system to download and upload files. Complete details for this program first appeared in the November 1983 issue of Computing Now!

QUEST Similar to "Dungeons and Dragons", QUEST provides hours of glorious adventure.

STOCKS A complete stock management program written in BASIC.

SEE Also known as TYPE17, this utility will TYPE any file, compressed or not, allowing you read documents which are stored in a compressed form.

Only $19.95

or, $22.95 for 8" formats or two single density disks.
See order form for available formats.
Order as AFS#1

Almost Free CP/M Software — Volume II.

BISHOW is the ultimate file typer. This version will type squeezed or un-squeezed files and allow you to type files which have been archived with utilities such as LU (see below). BISHOW even lets you scroll up and down through typed files.

LU is a library utility which stores multiple files under a single file name in order to save disk space. Files can be removed from the library as they are needed.

MORTGAGE is a fancy mortgage amortization program which produces a variety of useful tables.

NBASIC Large, commercial BASIC's are powerful, but expensive. This one however is free, and every bit as flexible as many commercial packages. It's also compatible with North Star BASIC.

RACQUEL

Z80ASM is a complete assembler package which uses true Zilog Z80 mnemonics. It has a rich vocabulary of pseudo-ops, permitting you to use features of your Z80-based machine which are unavailable with ASM or MAC.

VFILE Easily the ultimate disk utility, VFILE gives you a full screen view of the files on your disk and allows you to do mass COPY and DELETE operations using a two-dimensional cursor. It has lots of 'extras', a built-in help file and it works very fast.

ROMAN Though some say it's silly, this novel little program is a fun way to convert ROMAN numerals into decimal numbers.

CATCHUM If you like the fast pace and incredible realism of Pacman, you'll go quietly insane over CATCHUM... which plays basically the same game using ASCII characters. Watch little "C"'s gobble periods while you try to avoid the delay "A"'s.

Only $19.95

or, $22.95 for 8" formats or two single density disks.
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Almost Free CP/M Software

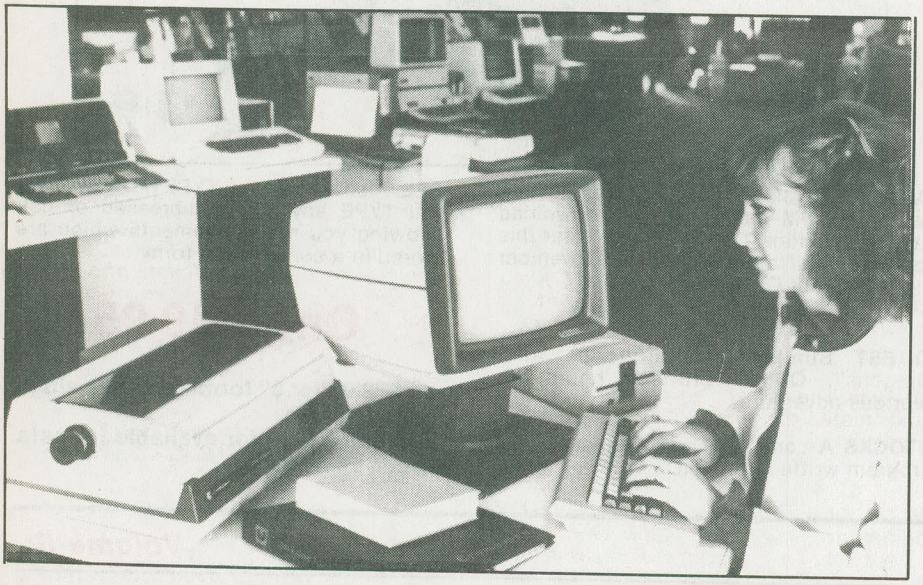
Volume III

OIL An interesting simulation of the working of the oil industry. It can be approached either as a game or as a fairly sophisticated model.

CHESS This program really does play a mean game of chess. It has an on-screen display of the board, a choice of colours and selectable levels of play.

DEBUG The DDT debugger is good, but this utility adds many new facilities and does symbolic debugging. It's almost like being able to step, trace and disassemble through a source listing.

LADDER Fast, bizarre and probably a major cause of eye strain. This program plays like Donkey Kong with ASCII characters.



DU87 This version overcomes several limitations of the older DUU program and adds some new features. It will adapt to any system and can search, map and dump disk sectors or files. Its invaluable in recovering damaged files too.

ELIZA Written in MBASIC, this classic program is a microcomputer analyst. With little imagination you will be able to believe you are conversing with a real psychiatrist.

QUIKKEY Programmable function keys let you hit one key to issue a multicharacter command. This tiny utility lets you define as many "macros" as you want, with seldom used control codes. Keys can be redefined at any time... even from within another program.

RESOURCE While a debugger will enable you to disassemble small bits of code easily enough, only a true text based disassembler can take a .COM file and make source out of it again. This is one of the best ones available.

Only $19.95

or, $22.95 for 8" formats or two single density disks.
See order form for available formats.
Order as AFS#3

Gemini WordStar Press

With all its many strengths, WordStar's printing function is very slow. It can also be difficult to get page numbers and headers to appear the way you want them... and where you want them.

PRESS is a utility which handles the formatted printing of all sorts of text files such as manuscripts, drafts, program listings... anything that you'd normally want printed in page form. PRESS installs the header of your choice at the top of the page and prints the page number beside it.

It also provides a running count of characters and pages printed. You can print with a variety of type size and style permutations, depending on the capabilities of your printer.

Most important, PRESS will send formatted text to your printer as fast your printer can accept it.

PRESS comes configured for Gemini 10x and 15x printers, but will work with most Epson compatible dot-matrix printers. A version is also available for daisy wheel printers. PRESS is easy to use and very fast.

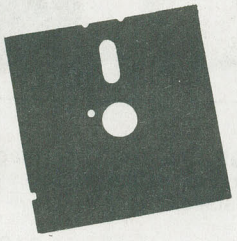
Only $19.95

Order as PRESS

Steve's Wunderdisk

Over the years many first rate program listings have graced the pages of Computing Now!. And we have many which have never been published. We've collected the best of these and put them on one disk. Included are programs like STAR, for setting up a Gemini 10 printer, the Last WordStar Unhook, CPMAP and the CP/M HOST program, complete with several unreleased support programs.

The Wunderdisk is an excellent collection of tricky CP/M routines. Its ideal for anyone who wants to make their CP/M system sing. And the programs on the disk are well documented... most of them have been explored and explained in the pages of Computing Now!



Only $19.95

See Order Form for available formats.
Order as WUNDER

Apple WordStar Fixer

Apple compatibles and WordStar are not entirely friendly. Apple compatible systems equipped with Videx type eighty column cards do a number of unpleasant things to this popular word processor. While there are simple cures for this... they all involve some delicate code hacking.

The FIXER solves this problem. Place it on the same disk as your copy of WS.COM, type FIXER and after a suitable amount of disk noise, you'll have APWS.COM on there too. This patch version releases the control K's, translates the left arrow to a delete character and patches Unitron keyboards.

In addition, the FIXER lets you change certain default settings which are not alterable with MicroPro's INSTALL program. All features are menu-driven for easy operation.

Will run in either 44K or 56K CP/M

Only $19.95

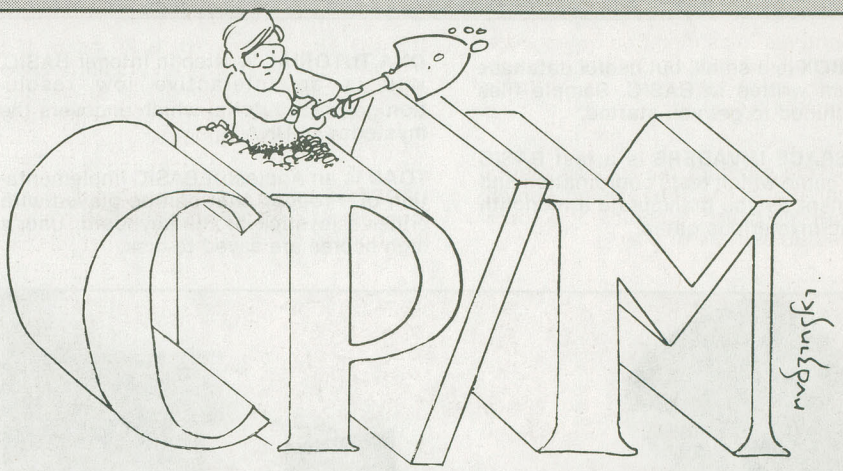
Available for Apple II series with CP/M.
Order as FIXER

To order use order form or call (416) 445-5600 for Visa, Master Card and American Express orders.

Almost Free CP/M Software

Moorshead Publications

Almost Free CP/M Hacker Software



SUPERZAP is a disk utility similar to the DU programs. It lets you modify your disks at the track and sector level, patching code and fixing BDOS errors. But, unlike DU, its all menu driven with a full screen editor.

MEMDSK32 is the best memory disk program we've ever seen for CP/M systems. It runs on any 64K system to create a 32K RAM disk labeled drive D. The source is included, in case you'd like to alter its parameters.

ZDEBUG is a Z80 debugger. Its function is analogous to that of DDT, but it works in Zilog mnemonics rather than those of the Intel 8080. As such, it won't give you lines of question marks when you're trying to patch your BIOS or other commercial software.

ZESOURCE and REZ are two of the most powerful disassemblers ever created. They'll create salvageable assembler code from any .COM file. With perseverance you can recreate the source code for most existing software in order to learn its secrets or patch it for your own applications. Especially useful for patching CP/M. Both are supplied to allow you to use simple assemblers or M80 and L80.

COPY is a handy way of copying an entire disk, files and system tracks, onto another floppy. Includes source code.

PROBE digs through your version of CP/M and tells you everything there is to know about it, including the locations of its various components, where things *jump* to, how the disk allocation is set up, etc. A splendid tool for low level programming.

DU-V88 The latest version of this tried and trusted disk utility. This one also includes the long sought after DU.DOC file.

MLOAD24 is a replacement for the LOAD command... with considerably more power. It is ideal for doing loads that call for merging in overlays, multiple hex files, etc.

ASM65 is a 6502 cross assembler. It runs under CP/M, but assembles 6502 source code. Its extremely useful for developing sophisticated Apple software and for doing EPROMS for 6502-based systems. In fact, it supports the entire range of 6500 series processors.

Only $22.95

See Order Form for available formats.
Order as HACKER

MDM730 for Apple CP/M

First featured in the July 1984 issue of Computing Now!, MDM730 is one of the most powerful MODEM7 programs available. Our version incorporates features not available in the public domain. MDM730 is an efficient, easy-to-use software tool for anyone interested in telecommunications, bulletin boards and downloading software. Consider these features:

- Terminal program which works at any baud rate.
- Ten programmable macro function keys.
- A Phone number library for 36 numbers.
- Christensen software transfer protocol.
- User selectable toggles for linefeeds, ON-XOFF, etc.
- Extensive help menus.
- Baud rate selection on the fly.
- ASCII dump and capture.
- Status menu.

In addition, we've added dialing support for the Apple version. While the standard MDM730 can not dial unless it's hooked to a Hayes Smartmodem, we've added patches to allow it to do pin twenty-five pulse dialing and to dial through the Hayes Micromodem II and the SSM card. The Computing Now MDM730 will also:

- Select a number form the library and dial it.
- Dial manually entered numbers.
- Log you on to a remote system if it's free.
- Optionally autodial if the remote system is busy.
- Keep track of the number of re-dial attempts.

The Computing Now! MDM730 package is available for:

- The Hayes Micromodem II card.
- The SSM 300 Baud modem card.
- The PDA 232C serial card with external modem.

The PDA 232C package includes versions supporting both the Smartmodem and a dumb modem with pin twenty-five control, such as the Novation AutoCat.

Each package also includes utilities for updating the phone number library and redefining the function key macro strings, as well as an extensive help file.

The source code for this program is over one hundred and fifty kilobytes long and can not be hacked on a standard Apple system. We patched it on a larger machine and downloaded it. We're confident you won't find MDM730 with these features anywhere else.

Only $29.95

Available for Apple II series and compatibles with CP/M

Order as MDM730
and specify modem type

Almost Free Apple DOS Software

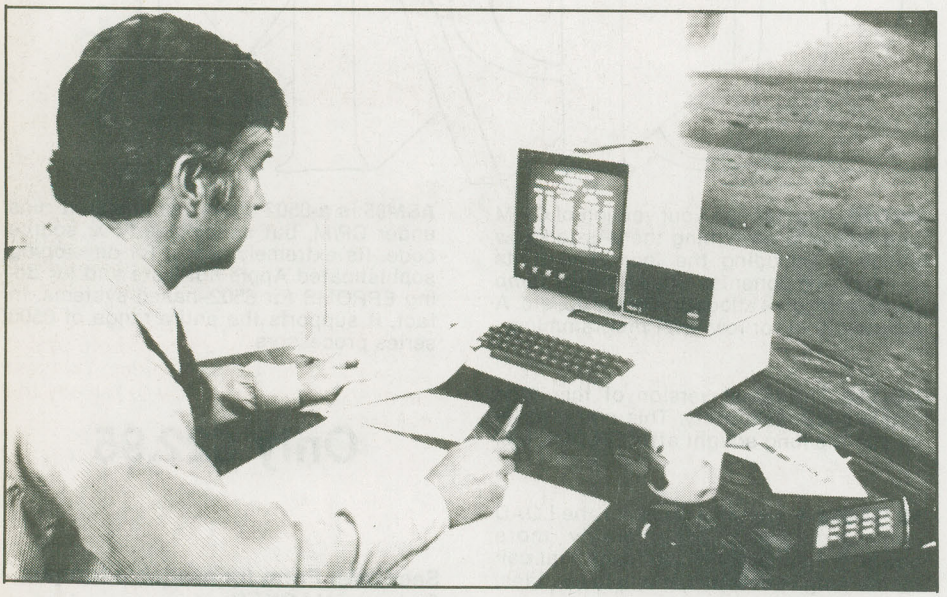
Volume I

DATABOX is a small, but useful database program written in BASIC. Sample files are included to get you started.

NULLSPACE INVADERS is a fast BASIC HiRes game which tests coordination and judgement as you manipulate a monolith through mysterious gates.

DNA TUTORIAL Written in Integer BASIC, this is an interactive low resolution graphics tutorial which uncovers the mysteries of DNA.

TOAD is an Applesoft BASIC implementation of 'Frogger' that can be played with either a joystick or the keyboard. User's high scores are saved to disk.



FUNCTION PLOTTER is a sophisticated Applesoft BASIC program that takes any inputted function and plots it on the HiRes screen.

DATA DISK FORMATTER is a binary program which formats a disk without putting DOS on system tracks, freeing up more room for data on multiple drive systems.

BASIC TRACE is a utility for the advanced Applesoft programmer which displays the hexadecimal locations of each Applesoft line number currently in memory.

GEMINI UTILITY is a word processor pre-boot utility for Gemini printer users which initializes the printer's font or pitch before you boot your word processor.

PAYMENTS This basic program enables you to keep track of payments and credits to and from up to 100 accounts on a single disk. A sample account is included.

PICTURE CODER Standard Apple II high resolution graphics pictures are require an inefficient 36 sectors of disk space. This utility creates graphics text files, squeezing out the zero bytes that can later be EXEC'd into memory. These text files often take up less space on disk than regular graphics files.

Only $19.95

Order as AFAD#1

Volume II. — Almost Free Apple DOS Software

AMORT is a monthly amortization program that calculates monthly payments, principle and interest on every balance and prints the resulting chart.

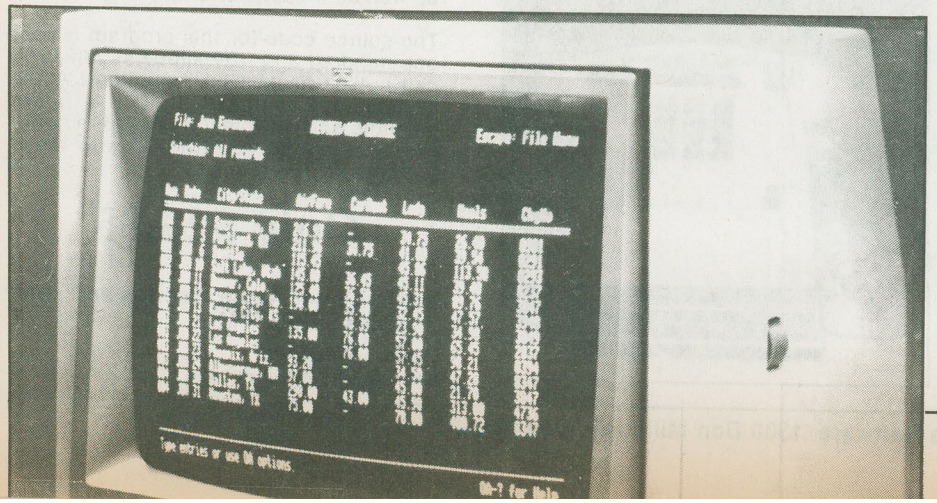
VOICEPRINT An unusual program that uses the HiRes screen to sample sounds inputted through the Apple's cassette jack. Sampling rate and other variables can be controlled, and two sounds may be compared side-by-side.

CALC NOW! Written in BASIC, this spreadsheet program is not as fast as VisiCalc, but it still offers the power you expect from a spreadsheet. With sample files.

CAVERN CRUSADER A mix of BASIC and binary programming, winning this game is difficult, to say the least. For every wave of aliens shot in the cavern, there's always a meaner bunch waiting in the wings.

NEWCOUT This binary program replaces the I/O hooks in the Apple with its own so you can operate your Apple through the HiRes screen. Includes a sample character set and program source code.

CHARSET EDITOR A utility for creating graphics character sets to use with NEWCOUT.



CALENDAR A BASIC program for finding a particular day of any inputted month and year. A calendar for any year can also be print.

LCLODR2 With source code, this binary utility BLOAD's any given file into the 16K language card space at $D000. The source listing is useful in showing how to use DOS commands in assembly language.

CRISTO REY is an animated HiRes BASIC program which displays Cristo Rey by moonlight. For apartment-bound romantics.

ATOT An acronym for 'Applesoft to Text'. EXEC this textfile to produce a textfile of your program.

APPLESOFT DEFLATOR This program takes textfiles created with ATOT and squeezes them replacing PRINT statements with '?' and removing unnecessary spaces form the listing.

Only $19.95

Order as AFAD#2

Almost Free Apple DOS Software — Volume III

GENERAL LEDGER is an extensive BASIC general ledger program.

EE-DESIGN A shape and design program written in BASIC. Lets you plot shapes in HiRes graphics and save them to disk or print them out.

QUICKZAP is a disk sector utility that reads a given track and sector into memory and permits you to alter it and write it back to disk.

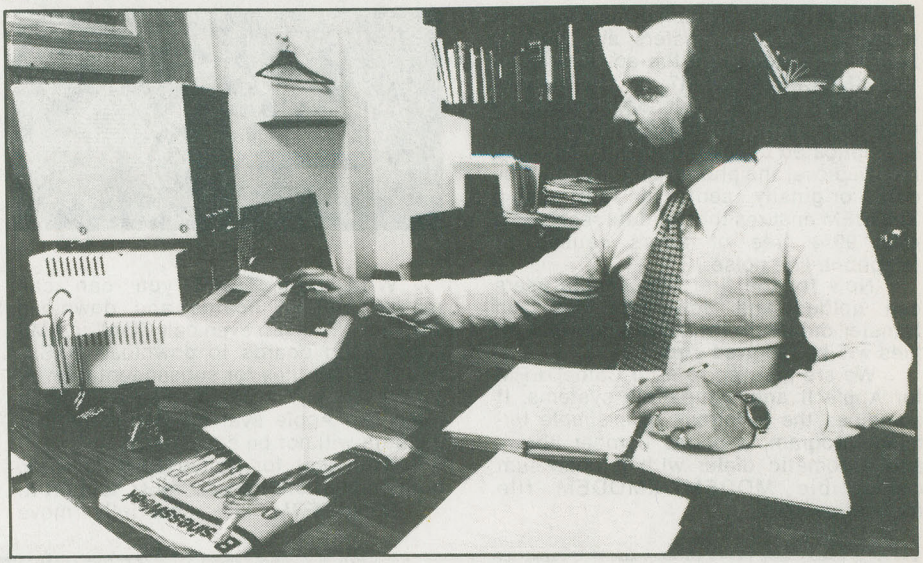
SOFTGRAPH A complete graphing program written in a combination of Applesoft and Assembly language that enables you to see your data plotted in pie, line or bar charts.

INTELLICALC An intelligent calculator with three memories and a 'paper tape' readout.

POKER! A fast Applesoft BASIC version of this popular card game. Harmless electronic avarice.

POLAR GRAPHICS Similar to Function Plotter, this BASIC program supplies a number of attractive functions in REM statements which can be used to plot on the HiRes screen.

CLOCK AND CLOCK II Two Applesoft digital clocks to help you keep track of those late hours spent at the keyboard. One has an alarm function.



CONVERT UTILITY A BASIC program that converts number between decimal, hexadecimal, binary and disk sectors.

FLOWERS An assembly language program that prints a border of flowers around the high resolution screen. Source code is included as an valuable lesson in handling HiRes shapes in assemble language.

ProDOSfix.TXT Apple clone users who have purchased ProDOS will note that it doesn't work on their machines. This text file explains why, and how to remedy the problem.

Only $19.95

Order as AFAD#3

A Teacher for the Apple

Specifically developed for the educational market, this disk introduces both teachers and students to the Apple II series and compatible systems.

It is designed to show you how to make the computer work for *you*.

After introducing you to the computer, it goes on to explain the BASIC programming language. With step-by-step instructions it shows you the ins-and-outs of Apple programming and explains the workings of DOS and high resolution graphics.

Designed for new computer users, just turn on the computer, slide in disk, and enter the world of Apple programming.

Requires Applesoft BASIC, 48K RAM and one disk drive.

Only $35.00

Order as TEACHER

Apple DOS Wunderdisk

Over the last few years, Computing Now! has featured many programs for Apple II users. These programs have involved a lot of work and have been thoroughly debugged. Because the tedious job of typing in program listings is not everyone's favourite past time, we've gathered together a collection of our best Apple programs and put them all on a single disk. Enshrined on this disk are some of the classics of the past.

You get DOSdial, the dialing terminal program, Clef Hangar, an Apple music box, Skyhook, a radio teletype converter, Fruit Crate, a small bulletin board system, MuGraph, an experimental sound system, Hashit, a sorting routine, JoyGraph, a graphics program, and of course, the infamous Blort! Ah, the memories!

Only $16.95

Order as Apple DOS Wunderdisk

Almost Free Electronics Design.

Contains BASIC utilities for attenuators, highpass and lowpass filters, series and parallel resistors, slew rate prediction, resonant circuits, power transformer selection, audio transformer selection, RMS-average-peak conversions for full and half-wave, transistor selection, and more. Also contains a program for determining the parameters of strobe light circuits; it determines power ratings, time constants, capacitor size, resistor sizes, operating voltages, dissipation and other necessary calculations. Written by Bill Markwick, the editor of Electronics Today, the utilities are not copy-protected and are easily modified to suit the user's requirements.

Available for MS/PC DOS with GWBASIC or Apple II systems with Applesoft BASIC.

Only $19.95

Order as DESIGN

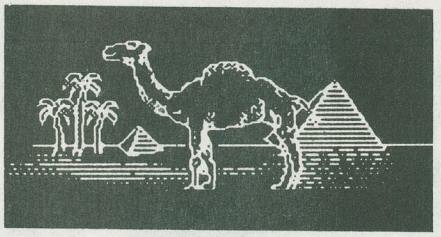
Almost Free Apple DOS

Camel Term for Apple DOS

CP/M and IBM PC system owners who use modems for file transfers and bulletin boards have long had the advantages of the XMODEM/MODEM7 or Christensen file transfer system. Telecommunications programs using XMODEM perform some sophisticated checks to ensure that data received over the phone is identical to the data originally sent. In fact, using XMODEM ensures that all data received is over 99% free of errors caused by telephone line noise.

Now for the first time, Apple users can upload and download files and transfer data with the knowledge that all files will be received error free.

We are pleased to offer CamelTERM for Apple II and compatible systems. It combines the functions of a simple terminal program, a phone number library and automatic dialer with a checksum compatible MODEM7/XMODEM file transfer system.



With CamelTERM you can call remote bulletin boards and download software. You can even call CP/M and MS DOS-based boards to download BASIC and PASCAL files for subsequent conversion to Apple. You can also send files between two Apple systems confident that the data will not be corrupted.

Note that for CamelTERM to work, both ends of the transfer must support it.

CamelTERM will cheerfully move binary files, machine language code and high resolution pictures. It will handle files up to twenty-four kilobytes long and supports multiple baud rates on some serial cards. At present, the following cards are supported:

- PDA 232C with Hayes Smartmodem or equivalent.
- Hayes Micromodem II at 300 baud only.
- SSM Modemcard at 300 baud only.

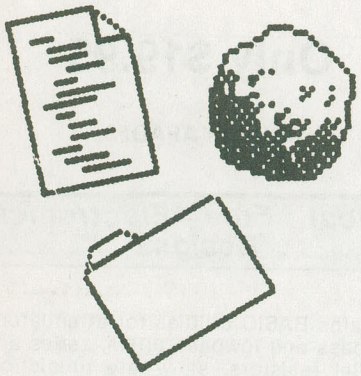
These cards can be in any slot from one to seven. CamelTERM will not work on clones of these cards.

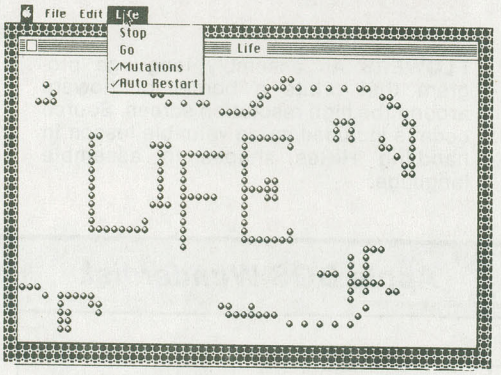
Best of all, CamelTERM is inexpensive.

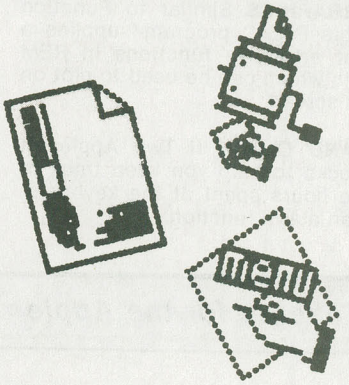
Only $32.95

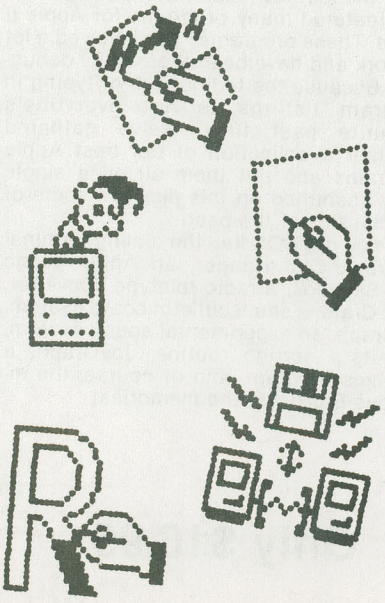
Order as CAMEL and specify modem type

Volume I. Almost Free Macintosh Software









ASTEROIDS This is a splendid implementation of one of the most popular arcade games of all time. The graphics and sound effects are amazing.

RED RYDER Telecommunication on the Mac has never been this easy. RED RYDER includes XMODEM and Kermit protocols and many other features.

BINHEX is a utility for RED RYDER which converts applications files to binary files and back again to allow them to be transferred over phones lines.

LIFE is one of the classic computer programs, and this version is exceedingly well done.

VIEW PAINT Ever wanted to look at a MacPaint drawing without getting into MacPaint. This utility lets you sneak peeks at your drawing files without fussing about.

MacCLONE Many users have found the Mac's disk copy routine to be less than perfect. This is a vast improvement. It even defeats a number of copy protection schemes.

RESOURCE EDITOR Macintosh icons and other resource items just cry out to be personalized. This little tool will help you make your Mac look its best for you.

SCREEN MAKER Moving text from MacWrite to MacPaint can be a bit disappointing... something gets lost in the clip board. This utility helps your words make the trip unscathed.

FONT EDITOR For those longing to make their own fonts... and for those who just want to adjust the ones they have... this editor lets you shuffle fat bits to your heart's content.

MENU EDITOR A handy utility for editing the words in Macintosh application menus.

Only $29.95

Order as AF-MAC #1

To order use order form or call (416) 445-5600 for Visa, Master Card and American Express orders.

Almost Free Macintosh Software — Volume II

FONT LIBRARIAN A splendid alternative to the Macintosh system font mover, this utility makes it easy to create custom collections of Macintosh fonts.

WIZARD'S FIRE This is a lively game which comes with still more lively games tucked away in the desk accessories. Get the magic rays before they get you.

SWITCHER Multitasking on a Mac? Why not. SWITCHER lets you run up to four applications concurrently on a 512K 'Fat Mac'.

RAMSTART Creates a RAM disk of any size on a fat MAc, and effectively increases the speed of most applications several times over.

MADONNA A MacPAint picture of the popular pop star.

MOCK CHART A desk accessory to handle the creation and printing of small business charts.

DAM A *D*esk *A*ccessory *M*anager for setting up the Apple menu on your Macintosh the way *you* want it.

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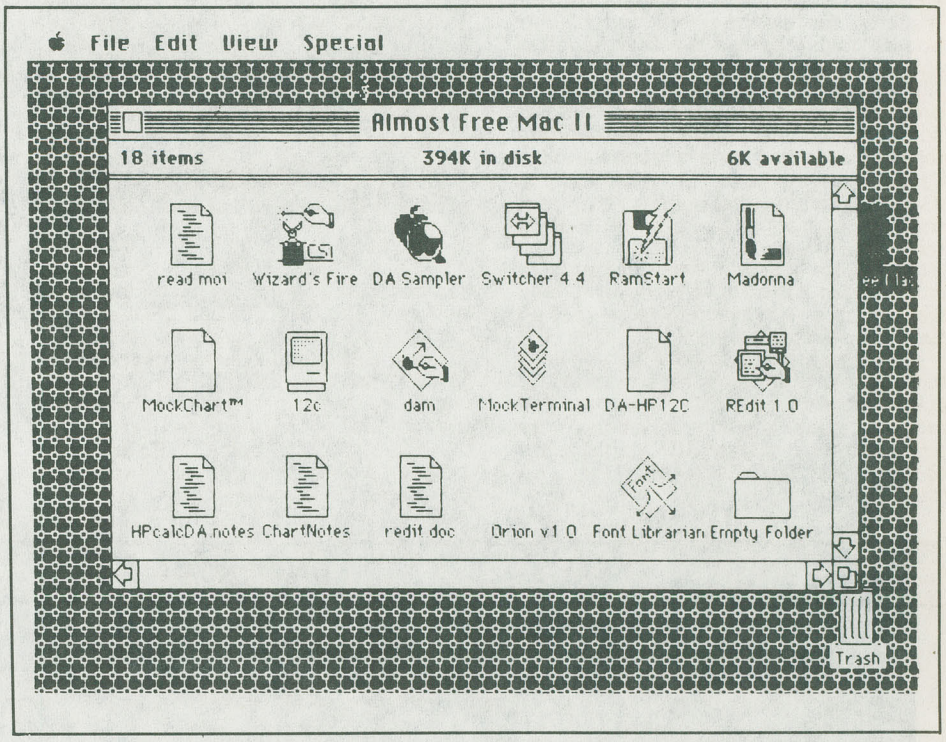

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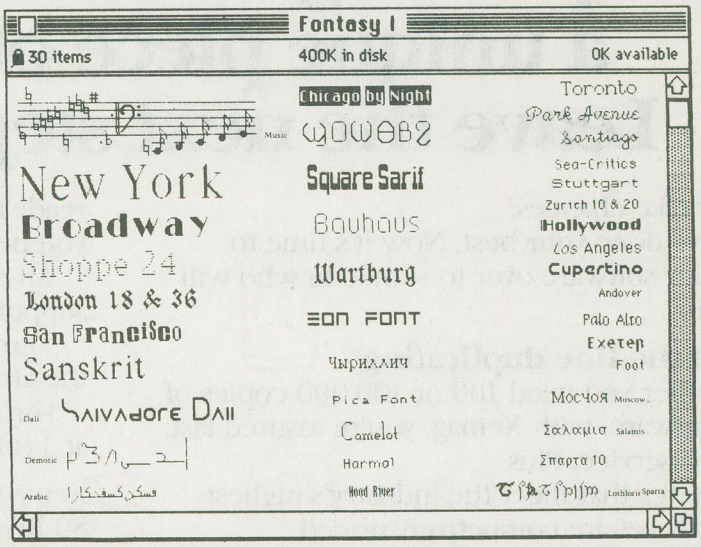

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tomers are looking for more than a good price, although that is still important. Customers are looking for the 'added on value'. The Mark III provides this. First lets look at what has become to be known as the STANDARD. It consists of a maximum of 256K RAM on the main board, an 8 bit processor running at 4.77 MHz, one (possibly two) 360K 5 1/4' full height disk drives, no video board, a 150w power supply, a keyboard and a 90 day warranty. The Mark III intended to improve on all facets of the STANDARD, for instance the *minimum* configuration for a Mark III is:

1. 256K of RAM though expandable to full a 640K on the main board without adding any additional boards.
2. The processor clock speed is switch selectable from 4.77 MHz to 8.0 MHz, thus giving about 68% increase in speed.
3. A reset switch: the IBM PC required a power down to reset the machine, this usually degrades the lifetime of both the machine and hard drives installed.
4. Two, half height 5.25in. disk drives leaving room for both hard drive and tape back-up expansion.
5. A video board, either colour graphics, or monochrone. It's the customers' choice.
6. A parallel port for a printer.
7. An RS-232/C serial port.
8. A real time clock/calendar that maintains time when the machine is powered off.
9. A keyboard.
10. A 150W power supply. This is far more power than the basic system takes and allows for a lot of additional features.
11. 300 day Warranty.
12. Phoenix BIOS.

It can be seen that the Mark III has taken the STANDARD and improved upon it in almost all respects. For this reason the Mark III has become the flagship for BEST Computer Corp. Indeed, not only have individuals welcomed the added features but in more than one case, companies have actually sponsored their employees to buy the Mark III after evaluating the competition. The Mark III represents a new approach to marketing PC compatibles: make them faster, make them better, make them cheaper. Compare this with the earlier days of Apple where the word *cloning* fitted the description very well, today the word *compatible* seems a better description.

BEST Computers now understood the direction of the market place. This started about 10 years ago with Z-80 based CP/M systems whose users were few, but technically informed. The market reached puberty with the Apple II or IIe, whose users were perhaps less technically informed, but their members were far greater. Today the market is maturing with the *standard ization* of the IBM PC whose users are professionals. These users are less inclined to care about the technical aspects of the machine and are more likely to care about its cost, compatibility, expandability and obsolescence in that order. With these ideas in mind BEST Computer Corp. now turned its attention to address these professionals.

Expanding Horizons

In the spring of 1985, two new projects were well underway to supplement the Mark III. These were the Mark IV and Mark V. The Mark IV was to be based on the 8086 running at 8MHz and the Mark V was to based on the 80286 running at 16 MHz. The Mark IV was to be IBM PC compatible and the Mark V IBM AT compatible. The name Mark V did not last long however, since it was felt that it would not be recognized as an IBM AT compatible. For this reason the Mark V was changed to AVT-286: the name incorporated the AT compatibility, V for Mark V, and 286 indicating the processor it uses. These machines were designed to meet the needs of the scientific or large database user who needed a high speed, 16-bit data path processor.

The BEST Mk IV

The Mark IV is an interesting machine since it bridges the gap between 16 and 8-bit personal computers. The IBM PC and the Mark III are both based on the 8088 which is an 8-bit microprocessor with 16-bit internal wiring. All communications to the outside world is through the 8-bit datapath. This means that it transfers data 8 bits at a time to all devices, i.e. to RAM, from ROM, to floppies, to the video board, etc. Although the processor has 16-bit instructions, the chip multiplexes the data internally and performs them 8 bits at a time. The Mark IV was designed to relieve this bottleneck yet remain compatible with the PC 8- bit I/0 channel. The processor of the Mark IV is the 8086 which is a 16-bit version of the 8088. Any software written for the 8088 will run on the 8086, but faster. All data transfers to and from RAM and ROM are 16 bits wide. What this means is that the Mark IV runs programs and calls the BIOS 16 bits at a time, yet remains compatible to the PC I/0 channel allowing the user to plug in his PC peripheral cards.

Because the Mark IV's speed would be hindered by any expansion memory, full 640K of RAM is standard on Mark IV. In addition, all of the standard features of Mark III are included like serial ports, parallel ports, real time clock, reset and speed switches, 300 day Warranty, etc. Also it should be mentioned that the 8087 (the math co-processor) is actually a 16-bit device but was crippled so that it would be compatible with the 8-bit 8088. Now that it resides in a 16-bit environment, the speed improvement of the 8087 will even be greater. The improvement in speed is because the 16-bit bus is heavily program dependant, however it is usually 30-40% faster than its 8-bit counterpart. This speed improvement, coupled with the increased clock rate, gives a combined speed improvement of over 100% compared to the IBM PC. It's obvious that this machine was really meant for the intensive database or scientific use;, in fact, a customer profile has shown this to be true. Not all users require the extra speed but some bought the machine anyway. There was a case where a department manager bought all Mark IV's for his department. Word spread that this particular department had high-speed PC's. Eventually this manager's supervisor learned that all his subordinates had faster machines than he. Not to be out-done, the supervisor came and purchased one Mark IV for his own use and one AVT-286 as a central database.

In summary the Mark IV is a true 16-bit machine, but remains compatible to the 8 bit PC I/O channel and has all the *added-on value* of the Mark III.

The BEST AVT-286

In some respects the AVT-286 is similar to the Mark IV, both are 16-bit machines, both have 640K on board RAM and both have PC bus compatibility. The AVT-286 goes further however. The AVT-286 has an additional bus, it uses a more sophisticated processor, its RAM is expandable to 16M, it has a higher speed hard drive, it has a higher capacity disk drive, and the list goes on.

The AVT-286 is currently the top-of-the-line of the computer family supplied by BEST Computer Corp. It was introduced late in the summer of 1985 and represents the greatest affordable amount of computing power available to single users today. Learning from the mistakes of the very first computers in 1983,

BEST Computer Corp immediately licensed the BIOS for the AT from Phoenix Software Associates. When BEST announced the machine in 1985, they *hit the road running*. Not only was the machine available, but the BIOS was present and there was a full compliment of boards for the machine: floppy controllers, hard drive controllers, multifunction cards, and 4 Meg memory boards. Keeping with the philosophy of *added-on value* BEST includes the following above and beyond the standard issue of the IBM PC AT:

1. Switch selectable higher speed operation
2. Full 640K RAM on board
3. Video board
4. Two 5.25in diskettes, one 1.2Meg, the other 360K
5. A serial port
6. A parallel port
7. Reset button
8. 300 day Warranty
9. Phoenix BIOS
10. AT compatible keyboard
11. 200W power supply
12. Flip-top lid on the chassis
13. Keyboard lock-out key and lock
14. Front display panel
15. Floppy controller

While researching this article we had a chance to use all three machines, the Mark III, Mark IV and AVT-286. We wanted to test them for speed, compatibility and quality. Naturally these test were not scientifically accurate, but do represent trends. For the speed test we compiled a PL1 programmer on a 360K RAMdisk, namely VDisk, supplied on DOS 3.0. The reason we used instead of a diskette was twofold:

1. The drive characteristics between an AT and a PC are radically different. We wouldn't know if we were comparing speed of the drives or speed of the machines.
2. The 16-bit machines such as the Mark IV and AT cannot utilize their full power while talking to 8-bit devices.

We used as a Base the IBM PC XT with 640K running at 4.77MHz. The compile was of moderate length: 170 seconds.

The table below gives the results of the speed test.

Machine Type	IBM PC/XT 4.77 MHz	MK III 8 MHz	MK IV 8 MHz	IBM PC/AT 12 MHz (6 MHz CPU)	AVT-286 16 MHz (6 MHz CPU)
Time in Seconds	170	105	80	67	53
Relative Speed Increase	1.00	1.62	2.13	2.53	3.2

Looking at the table we see a number of remarkable things. The first is the speed of the AVT-286 over the IBM PC AT. The AVT-286 is about 25% faster than the IBM AT. The other remarkable thing is that the Mark IV is only 16% slower than the IBM AT! (This is even more remarkable considering the price differential). We also see, as expected, that the 16-bit data path of the 8086 in the Mark IV gives 31% improvement over that Mark III at equivalent processor clock speeds. It can be seen that all the BEST products are faster than their IBM counterparts.

We also tested some software packages that are available for the IBM machines. We tested Lotus 1-2-3, dBase III, Wordstar, Sidekick, Symphony and of course Flight and Jet Simulator. There's not really much to report except that all ran without a hitch and generally much faster than expected. Lotus and Symphony just screamed through their calculations, dBase again was faster, but the Flight Simulator was not noticeably faster. We were told that the reason for this was that Flight Simulator used the internal clock for its delays, not program loops, hence, it would run on any machine properly. This was the only program of the bunch that did not exhibit any speed improvement by running on one of the BEST machines.

Believing this too good to be true, we asked BEST Computer Corp. if there were programs that didn't run. They said that all properly written programs will run. A properly written program is one that does not jump directly to specific BIOS routines, but goes through the proper interrupt routines. Apparently a few minor games do this for speed optimization but no major software will. In other words all major pieces of software will run on all BEST products. At the heart of this compatibility lies the Phoenix BIOS. This is the reason so many other major manufacturers (Tandy, Kaypro, etc.) have used Phoenix BIOS.

When evaluating the *quality* of the machine, it's difficult to remain objective since some features are important to us, but perhaps less important to others. Nonetheless we believe we captured the main points of the machine. Of prime importance to us is the warranty, what to do when something goes wrong. BEST Computers offers a 300 Day Warranty, parts and labour. We compared this with three other companies, one being IBM, they all offered 90 days. This alone inspires confidence in the machines. One should be wary though of companies which offer absurdly long warranties. Chip and drive manufactures only offer 1 year warranties at best. So one must wonder how anybody can offer something better than the original parts at a reasonable price. We found the machine to be well put together with screws and nuts holding components together, not just snap-together-parts. The chassis had a flip-top which made it extremely easy to insert cards or reconfigure the machines. The front face plate was made of cast aluminum which gave a solid heavy feel to the machine. All in all the machine seems very rugged and durable as well as being aesthetically appealing.

We had the opportunity to see the manufacturing facilities of the company. What we saw was quite impressive: a full machine shop constructing the chassis and power supply cabinets, another shop building the printed circuit boards, and the main factory where the boards are stuffed with components, flow soldered, debugged and finally assembled and tested. It is comforting to know that when you see the *Made in Canada* label on their products, it is truly made in Canada, and not just assembled here.

The BEST Computer Corp. has built a line of products with the idea that the customer no longer wants a better toy, but wants a product that he can use as a work-horse for himself or his company. The AVT-286 best typifies this philosophy with its list of *added on value*, its long warranty and its list of peripheral boards specific to AT compatibles.

The Company

The BEST Computer Corp. has come a long way since 1983 when they produced their first machine, there were major decisions, major purchases and major commitments along the road. The future seems bright for the company looking at their past record. At this moment they are fairly quiet about future releases since they don't want to give their competitors any advance information, but they do say that their current motto is *Sell a solution not a band-aid* and are working to educate people for the future. With the product line that they have, with the support and personnel that they have, and with the dynamic marketing policies that they have, it is no wonder that BEST Computer Corp. has become Canada's largest independent PC manufacturer. At the current rate of growth, BEST Computers will soon leave domestic market and penetrate foreign markets showing the world Canadian High Technology.

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The PC Write Review

The latest version of this free public domain word processor is a lot more powerful than many paid for packages.

by Frank Lenk

A lot of otherwise fine software suffers from the disadvantage of having been written for the wrong computer. This affliction seems particularly rampant among word processors on the various IBM PC systems. WordStar... up till now, my pick of a somewhat bad lot... was written to take advantage of the older Z80 or 8080 microprocessors, and the CP/M operating environment. WordStar 2000 has the opposite problem, being designed to run on some idealized super system that doesn't exist yet.

Search as you will, you'll find the same dilemma. The mega processors... Multimate, DisplayWrite, Easy Writer and others... tend to be clogged with esoteric formatting functions, unbelievably expensive... and slow as molasses, unless you happen to own an AT or something like it.

PC-Write is different. In fact, it comes about as close as one could imagine to being the ideal word processing system for the plain, workhorse IBM PC. You don't need high speed hardware, megabytes of hard disk space... or very much money. Actually, you don't need any money to get started with PC-Write. Being shareware, you can get it from a friend for free, or for the publisher... Quicksoft... for the very nominal fee of ten dollars. Only once you decide you like it might you consider tendering a purely voluntary seventy-five dollar payment to officially register your ownership.

Feature Presentation

PC-Write is the creation of one man, Bob Wallace. Wallace's first text editor was a project called FRESS, which he created while at Brown University. Later, while creating Pascal compilers at Microsoft he had plenty of time to gain an appreciation of the limitations of the available commercial editing software.

As a programmer, Wallace was particularly disgruntled that most software insisted on being either text editor or word processor... but not both. Therefore he decided early on that his would be equally good either way... offering all the fancy block moves and format options of a full word processor, but also providing little conveniences like pure ASCII files and block indents for the serious programmer. He saw the early version as being "like a doctor"... if it didn't actually do you any good, it should at least avoid doing any harm.

Since then PC-Write has evolved into the Ben Casey of word processors. The word processing functions... like format codes, soft spaces and so forth... remain in an overlay that you can use or ignore at your convenience. The program remains remarkably compact, about fifty-five K for the editor itself, another thirty K or so for the page printer module and a dozen or fifteen K for optional help and configuration files.

Several features of PC-Write are obviously outstanding. Foremost of these is its blistering speed. A page up or page down in PC-Write happens so fast that you have to look hard at your text to realize that it's happened at all. Moving from the top of your file to the bottom... a single keystroke operation... is maybe a half a heartbeat slower.

Sure, there's a price... but a fair one. PC-Write keeps text entirely in RAM, which limits your files to about sixty kilobytes. However, PC-Write is smart enough to automatically split overly long files. You just specify an offset from the start of the file... in kilobytes... and the program creates a new file with an extension that includes the offset amount. I've never actually created a sixty kilobyte text file, so this doesn't hit me as much of a limitation. An upcoming update of PC-Write is expected to support a large memory model, which will let you cram something like a short novel into six hundred and forty kilobytes of RAM. You'll have to have a hard disk just to store a file of this size.

Aside from speed, the current PC-Write... version 2.55... has another highly endearing characteristic. It's totally user configurable. Margins can be defaulted anywhere at all, with horizontal scrolling way out into right field. More important, any key can be assigned any function, or any combination of functions. It's a bit like having a word processor construction set.

Printer codes are equally malleable. Any printer command sequence can be assigned to any alternate keycode, showing any onscreen character, and with any onscreen attribute. Printer codes are assigned to the combinations alternate A through alternate Z. Hitting any of these inserts one of the normally unused PC characters from ASCII zero to ASCII twenty-six. It also highlights the affected text, using the text mode of your choosing: inverse, highlight, lowlight or any combination of colour and background. Codes are usually set up to send an on sequence when first encountered, and an off sequence the second time. For example, alternate I switches italics on and then off.

The secret of all this configurability is in ruler files. PC-Write... ED.EXE... tries to find a ruler file with the same extension as the file you are editing. If no such special purpose ruler is found, it then tries for a file called RULER.DEF... the default configuration. The separate printer program... PR.EXE... uses RULER.PRT by default, or can be made to accept any other configuration file as needed. The ED and PR ruler files can even be one and the same, if you prefer to have one slightly lengthier file to having two smaller, more flexible ones.

Even the help screens... displayed by hitting F1 and then cursoring to the appropriate topic heading... can be retailored. ED.EXE has one page of built in help. The rest is contained in a file called HELPE.DEF, and is ingested when ED is run. Typical of PC-Write's transparency and consistency, HELPE.DEF is a straightforward text file. You can suck it in and mangle it to your heart's content. As long as it's smaller than twelve kilobytes, the help text resides uncomplainingly within the spare RAM on your display adapter.

PC-Write arrives configured more or less *a la* WordStar. However, you'll be discovering nifty new features for weeks. For instance, there's shift 5, which instantly... and I do mean instantly... converts a file from WordStar format. Or how about control K for an almost instant word, byte, character and letter count. For the programmer there's shift return, which automatically indents the next line to match

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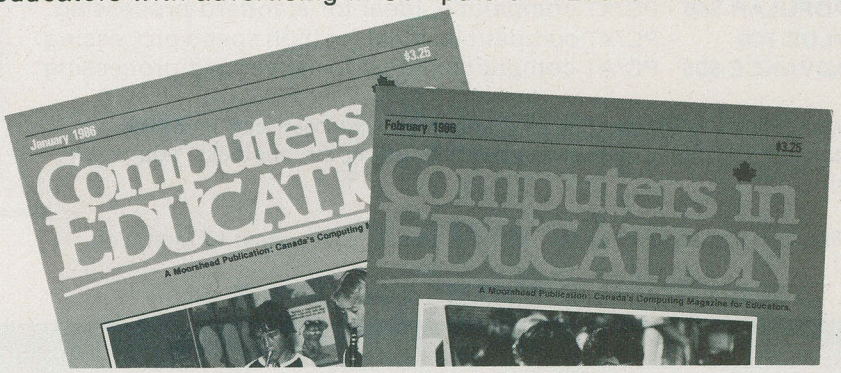

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PC Write Review

the previous one... perfect for Pascal, C or any other structured language. Alternate lets you enter any ASCII code, exactly as in DOS... for setting up those fancy boxes on your input screens.

Hitting control 2 initiates the record mode... a simple macro facility. Macros record keystrokes as they are executed, and terminate with a second press of control 2. Macros always play back via the grey asterisk key, the unshifted PrtSc, which is a bit of a limitation. If you want something fancier you have to go to the ruler file method or to a separate macro program like ProKey.

Hitting F2 displays the active ruler line... similar to the control OT command in WordStar. However, the PC-Write ruler pops up at the cursor position on the screen, and splits your screen into two somewhat independent windows. Whichever side you cursor into becomes active. You can do anything you like, even change files. The other side remains frozen as you left it until you hit F2 again and cursor into it. Then the first side is frozen and the current side reactivated. If you switched files, PC-Write writes and reads each time you switch windows, so it does not provide true multifile editing. It does come pretty close. With a RAM disk or a hard drive you'd probably never know the difference.

Sure, there are a few small things missing. A continuous row and column display would be nice, although you can temporarily view one whenever you want by hitting shifted F9. This function offers the bonus of letting you move directly to any page, row and column.

Reformatting under PC-Write is presently all manual. You can right justify, but you have to do it yourself, since the default is unjustified. Again, there's a compensation. You can hit shifted F5 to mark your entire file... as you would for a block function... then hit control B to reformat everything in one blindingly fast go.

Having printing handled by a separate program has its down side. Once more, there are mitigating circumstances. F7 on the help menu whips you straight over into the PR.EXE printer module. F4 provides a similar operation... one of my favourites... it runs a new DOS COMMAND.COM shell that lets you do all the usual DOS things. Typing exit at the DOS prompt puts you instantly back in the editor, just where you left off.

One peculiar thing about printer font codes is that they always switch off if the end of a line encountered, although they can of course be cancelled sooner, manually. The automatic shut off saves you from getting large blocks of accidentally italicized printout owing to an occasional mismatched code, but can be awkward in many circumstances. Longer sections of special print effects must be set by means of dot commands.

The dot command facility is similar to that in WordStar, but includes lots of powerful new features. There are multiline headers and footers, indexing, table of contents, footnotes and more. The PR.EXE module also handles a particularly powerful looking merge print facility.

The documentation for PC-Write comes in two forms. The free distribution diskette includes the manual as a compressed file, complete with a program that will print it out for you. If you splurge for registration, you get a pleasant coil bound book, obviously generated by PC-Write and a daisy wheel printer. The manual makes fine reading... I read it from cover to cover... but it's a rotten reference. The index is extensive but spotty, and I frequently find it difficult to find what I'm after. The excellent on line help screens make up for this to a degree. Quicksoft is working on a new manual, which hopefully will alleviate some of the present shortcomings.

The next version of PC-Write... version 2.6, is expected to have lots of new goodies, including automatic paragraph reformatting, proportional printing support and

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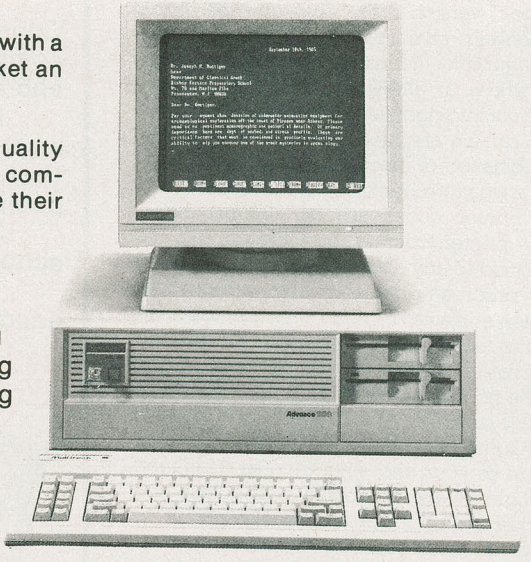

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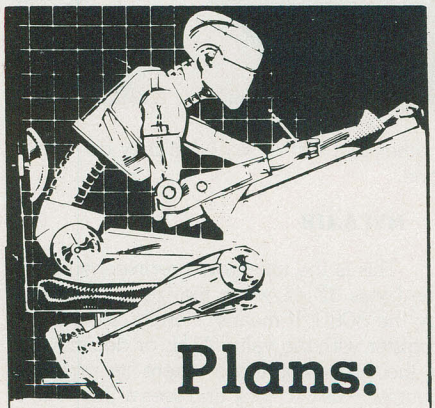
possibly some optional menu operated modes.

Version 3.0 should be a real treat. It's intended to add complete columnar modes and even a spelling checker. Also, it should be the one to blow away PC-Write's current sixty kilobyte file size limitation and permit editing up to the limits of available memory. Version 3.0 should be great for that novel you always knew you had in you.

After 3.0 comes out, PC-Write will actually begin to split into two programs, a tiny text editor, more like the early PC-Write, and the full blown word processing system. The validity of this concept... and the durability of the entire system... is demonstrated by the amount of use I am still getting out of my original copy of PC-Write... numbered as version 1.4, and apparently over two years old. It's over twenty kilobytes smaller than the latest version, and makes a great little program editor for someone still working off floppies.

Working from floppies is probably one reason I liked this program so much. If you have the bucks to blow on an AT with a twenty meg hard disk then you'll probably go ahead and spend five hundred bucks more for Mack Truck software. On a mega system that mega software probably starts to look practical.

However, on the unvarnished IBM PC type machine, PC-Write is almost certainly the best word processor cum text editor available... not to mention being the best buy at the price.



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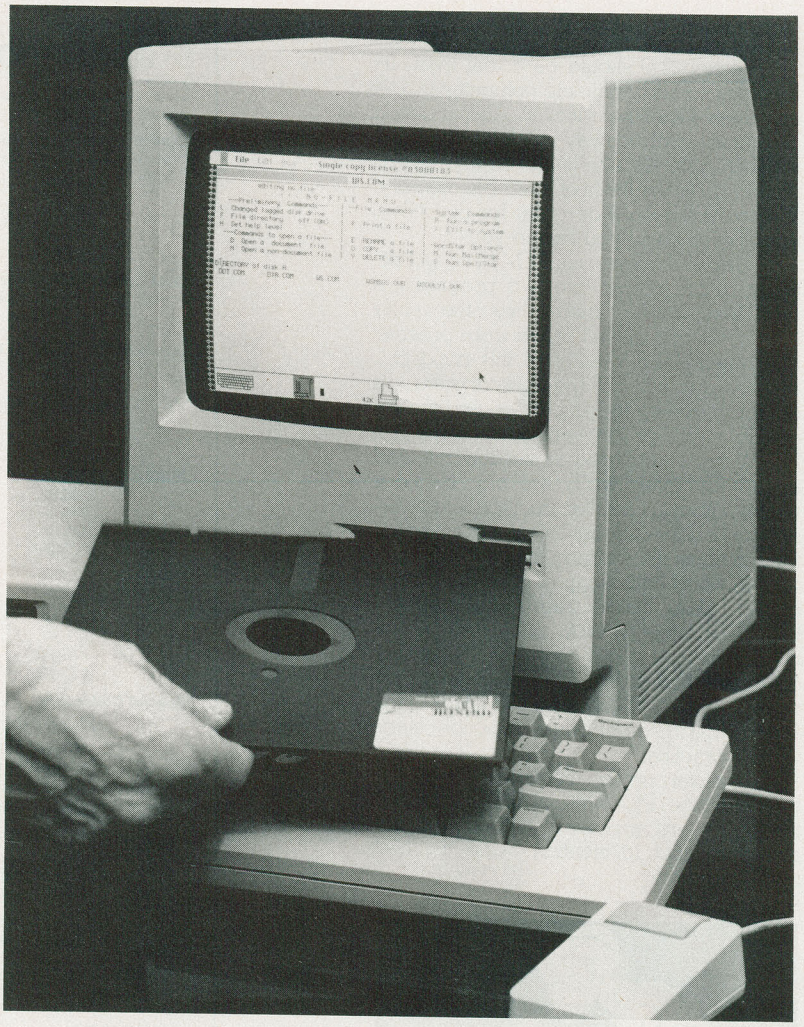
The C.P. Mac Review

This intensely strange application runs CP/M... that's old style CP/M-80... on a standard Macintosh. WordStar, arise!

by Steve Rimmer



Some things never really die... they just get rare. I think of CP/M like that. Hardy the rage that it was back in the pre-history of computers, it lingers on like an old dog that just can't rip cats apart like it used to be able to. Occasionally it springs up in weird forms. This package is unquestionably one of the weirdest.

Now, for those souls not into silicon hardware realities, CP/M was written to run on computers designed around a microprocessor called the 8080, an early precursor to the 8088 that powers the IBM PC. Without having looked up the manual to make sure this is completely accurate, I'm almost certain that not a single instruction of the 8080 is in any way compatible with the instructions of the 68000 chip that drives the Macintosh. This being the case, CP/M... and programs written to run under it... really shouldn't run on the Mac.

This is true. Usually they don't.

The C.P. Mac package from Logique is one of the cleverest applications anyone has ever written for the Macintosh. It may not look like it is when you run it, but there is some heavy thought in there somewhere. If you run C.P. Mac, your Macintosh will look for all the world like a CP/M based computer, and most CP/M software will run on it.

This does sound highly spooky, to be sure. Read on.

The Stuff of Hacks

Understanding just what C.P. Mac does almost insists that one get one's head into what a microprocessor does. We'll have the briefest of glances at it here. Don't worry, though... no relative offsets or index registers will be mentioned.

In a very real sense, all microprocessors are interpreters. If one loads an application program... such as MacWrite for a Mac or WordStar for CP/M... into a computer and runs it, one is pointing the microprocessor's "program counter" at the first instruction in the program and telling the microprocessor to do whatever it says to do.

The instructions in an object code file are machine language codes, a few bytes long at best. However, each one corresponds to a specific set of actions on the part of the processor. Different processors use different numbers to represent different actions, which is why, for example, CP/M based programs won't usually run on a Macintosh.

In order to make things a bit easier to understand for human beings, we tend to assign the instructions mnemonics, short names that sort of say what they do. Here's one.

MVI A,41H

This is the mnemonic representation of the bytes 3E 41 when they're encountered by the 8080. It means, literally, load the A register with the value 41H, or decimal 65. If the processor looks where its program counter tells it to look and sees a 3E, then, it takes the byte immediately next to it, loads it into the A register and then goes on to do what the instruction after the byte after the 3E says to do.

Obviously, if we were to have the Mac's 68000 try to execute these it would make something totally different out of them.

Now, consider a sort of weird program that synthesizes an 8080 written in 68000 code for the Mac. It would load a file of 8080 code into memory and start to interpret its bytes. If it found a 3E, for example, it would load the 41 into a bit of memory which has been defined as being the A register. It could, as such, do exactly what an 8080 would do but do it on a Mac.

If we wrote an 8080 program to interpret 8080 programs it would run very slow-

ly compared to the speed of a real 8080, as it would have to execute several real instructions for each instruction it interpreted. This is also so of an 8080 emulator written on the Mac, but as the 68000 is very much faster than is the 8080, the effective speed of a 68000 based 8080 interpreter isn't all that different from that of a real 8080 running in an 8080 based computer.

Having an 8080 running on a Mac in this way, it's not all that hard to see how one might run CP/M on it, as CP/M is really just an elaborate 8080 based program. There are a few conceptual hassles... we'll get to them... but for the most part such an arrangement works. This, then, is what C.P. Mac is at heart... not the real thing, but an incredible simulation.

Little Mysteries

C.P. Mac is a bootable... and non-copy protected... disk bearing a system, a funny looking Macintosh icon and an application which looks a lot like an eight inch floppy disk... the soul of CP/M. If one looks at the Mac icon one notes that it has an eight inch floppy disk in its screen too. Boot it and a CP/M window will come up. You'll see an A prompt and the system will behave very much like real CP/M.

Unlike as in the case of real Digital Research CP/M, C.P. Mac doesn't come with much CP/M based software to speak of. In fact, you only get one bootable program, a public domain disk utility called WASH, which isn't really all that good for anything. The first task inherent in C.P. Mac is actually in getting something useful for CP/M onto a Mac disk so that C.P. Mac will recognize it.

The approved way... according to Logique... is to PIP files from a CP/M based system through the Mac's modem port to C.P. Mac, which will there upon store them in the appropriate format. This would be a good trick if it worked... but few CP/M based systems have serial drivers in their BIOS's that are suitably well designed to handle this sort of thing reliably. One usually gets data dust for one's troubles.

In fact, there is a much better way to get things onto C.P. Mac, one which is largely infallible. It involves transferring files from a CP/M based system running some version of MODEM7 to the Mac running a compatible terminal package, such as Red Ryder. C.P. Mac thereupon allows one to translate the resultant files... which are regarded by the Mac as being just text files... into acceptable C.P. Mac files.

Virtually any CP/M based program which is well behaved will run under C.P. Mac. This "well behaved" trip does impose a few limitations upon one, but it's not as nasty as it is on most other systems. It generally means that programs should do all their I/O though the BDOS, which is true of almost all CP/M software in any case, as it was the basis for being able to use common programs on widely varying systems running CP/M. The exceptions to these, things that try to POKE characters into screen memory, use the 8080's IN and OUT instructions or read and write sectors directly to the disk through the BIOS, will not work.

As a few examples of these things, WordStar will run. One of its overlay files tends to confuse Red Ryder into thinking it's a Mac application when it's being ported unless you switch off the binary conversion feature. However, because the C.P. Mac package doesn't represent the fastest 8080 in creation... and because the Mac's disks are painfully slow... WordStar has a serious temporal problem, and grinds along pretty lazily.

Things like dBASE and Supercalc also seem to be quite happy with C.P. Mac, although neither of these is all that snappy either. Most of the CP/M stuff one finds on bulletin boards seem to do all right under C. P. Mac.

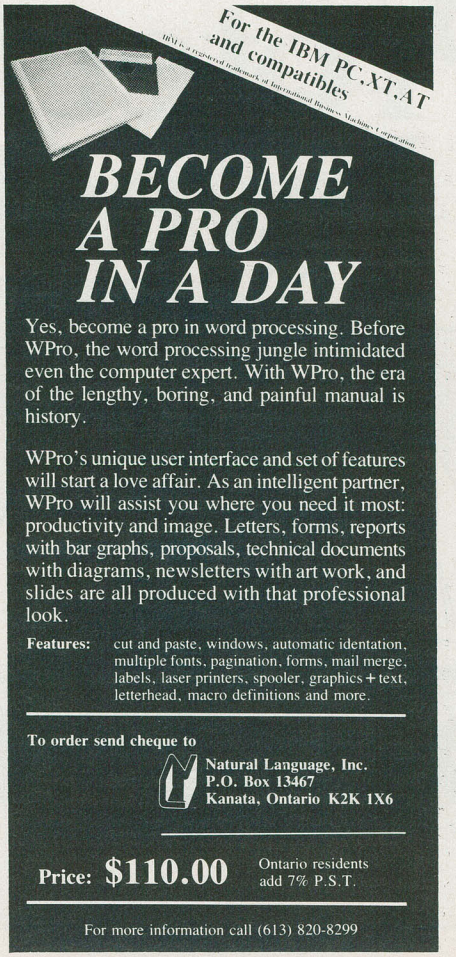
Telecommunications things are quite beyond C.P. Mac, as there doesn't seem to be any real way to communicate directly with the Mac's ports while thing's in its 8080 mode. Likewise, disk manipulators like DU tend to confuse it. The equivalent of a BIOS in C.P. Mac is really just a set of cues for the host 8080 emulator to go off and do some things in the Mac's real operating system. As such, trying to read and write directly to the disk tends to be a bit beyond it all.

While one can boot BASIC, for example, under C.P. Mac, and run all the usual sorts of programs under it, one can't expect to have any more facilities under C.P.Mac than one would have under any normal CP/M based system. The Mac's graphics, for example, are unreachable under CP/M. Its printer, on the other hand, is quite accessible, because there is a standard CP/M BIOS call for it which C.P. Mac has used to call the Mac's printing routines.

C.P. Mac allows for the almost effortless transfer of files between itself and the Mac's finder. As such, one can do things like play with a file under one operating system and then use it under the other. C.P. Mac runs perfectly with Switcher, so it's possible to have it and the finder on line at one time.

There are a number disagreements between C.P. Mac and CP/M. For example, it lacks a CCP completely... the console command handling is presumably done through things beyond the realm of the 8080 and passed to it. As such, programs which poke around up there will crash it. This will be especially true of anything that chains to another program.

Because the CP/M built in commands... ERA, DIR, TYPE and so on... usually reside in the CCP, it's not surprising that they aren't present under C.P. Mac. One must import COM files to handle their functions...



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The C.P. Mac Review

not an onerous task if you have access to a CP/M based system and a serial cable.

The control characters one is used to using under CP/M... control C to break out of things, control S to stop and start scrolling text and control P to echo text to the printer... are all ignored by C.P. Mac. There are clickable icons which perform the same functions.

Another thing that C.P. Mac doesn't support is read only files or disks... you can't set the R/O flag on a file even deliberately. This isn't much of a drawback... these things were a nuisance under real CP/M.

Finally, there is only one drive under C.P. Mac, this being drive A:. When asked to look at drive A: by a program, the C.P. Mac's BDOS will look at all the physical drives of the Mac, returning the names of any C.P. Mac compatible files.

Many programs which want to do something clever with CP/M will barf on C.P. Mac for these sorts of reasons.

Reality... What a Drag

Despite its impressive technological karma, one might well question the ultimate usefulness of C.P. Mac. It certainly has its place... you'll have to decide whether this is inside your Macintosh or not.

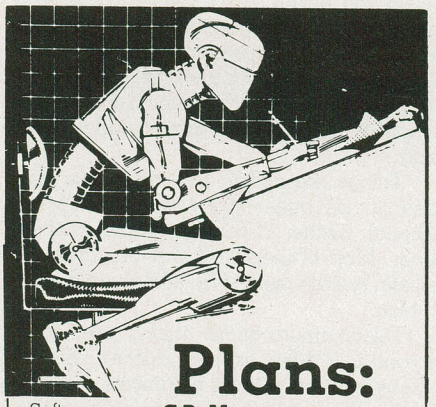
To begin with, unless you have a CP/M based system available with MODEM7 working on it and a transfer package on your Mac, C.P. Mac may be a bit of a turkey for you, as you won't really be able to get even the most rudimentary software over to the Mac to run on it.

If you are considering trying to run the more involved CP/M based software on C.P. Mac, be aware that the speed limitations of the package will probably drive you cliffward eventually, to eventually plunge you into the abyss of frustration.

Should you have a specific piece of business or scientific software that was written for a CP/M based system... which you don't fancy having re-written for the Mac... C.P. Mac will probably be the thing to make you start believing in a just and reasonable universe again... this is the sort of thing that it's ideal for.

Finally, of course, if you like to hack with computers and either have both a Mac and a CP/M based system or would like to, C.P. Mac is rather a lot of fun.

The impressive aspect of C.P. Mac is that it's a splendidly clever solution... albeit, still in search of a problem to solve for many Mac owners, as most devotees of the tireless mouse wouldn't let anything resembling an eight inch disk near their Macs. It won't turn one computer into another entirely, but it will allow the Mac to run some software it wasn't really intended for. If this happens to be yours, you're laughing. **SN!**



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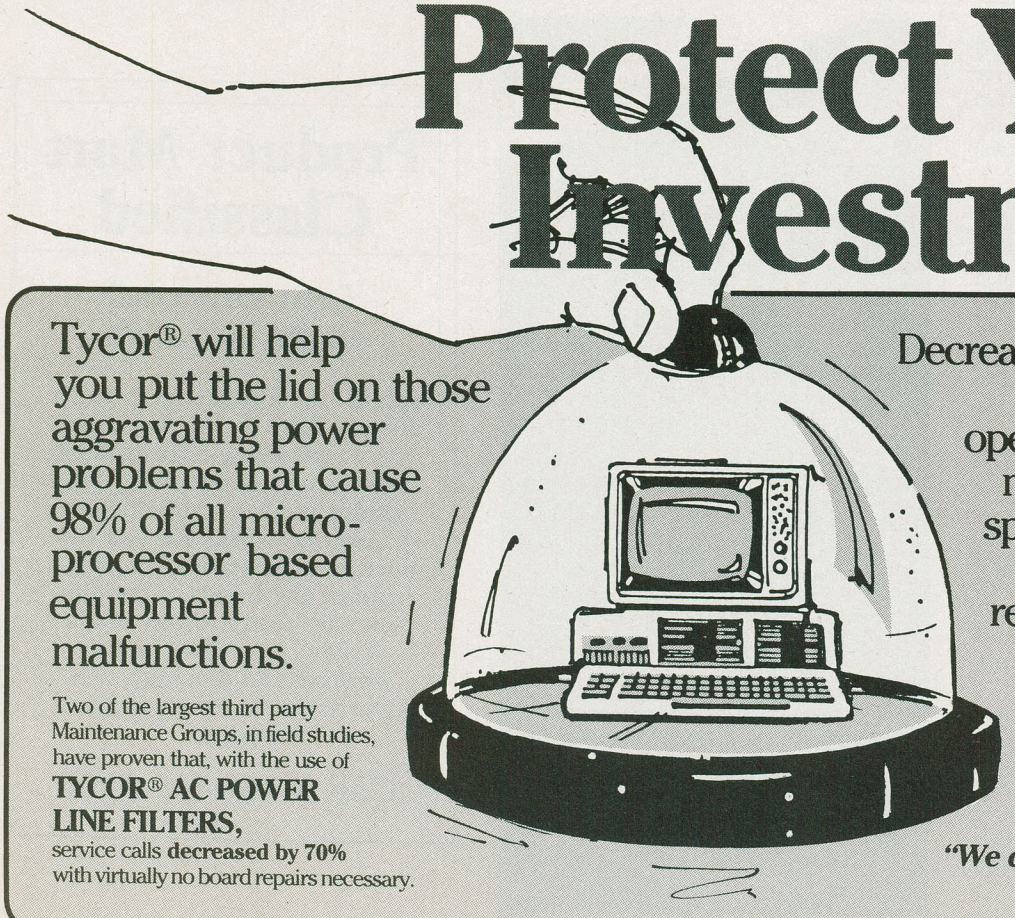

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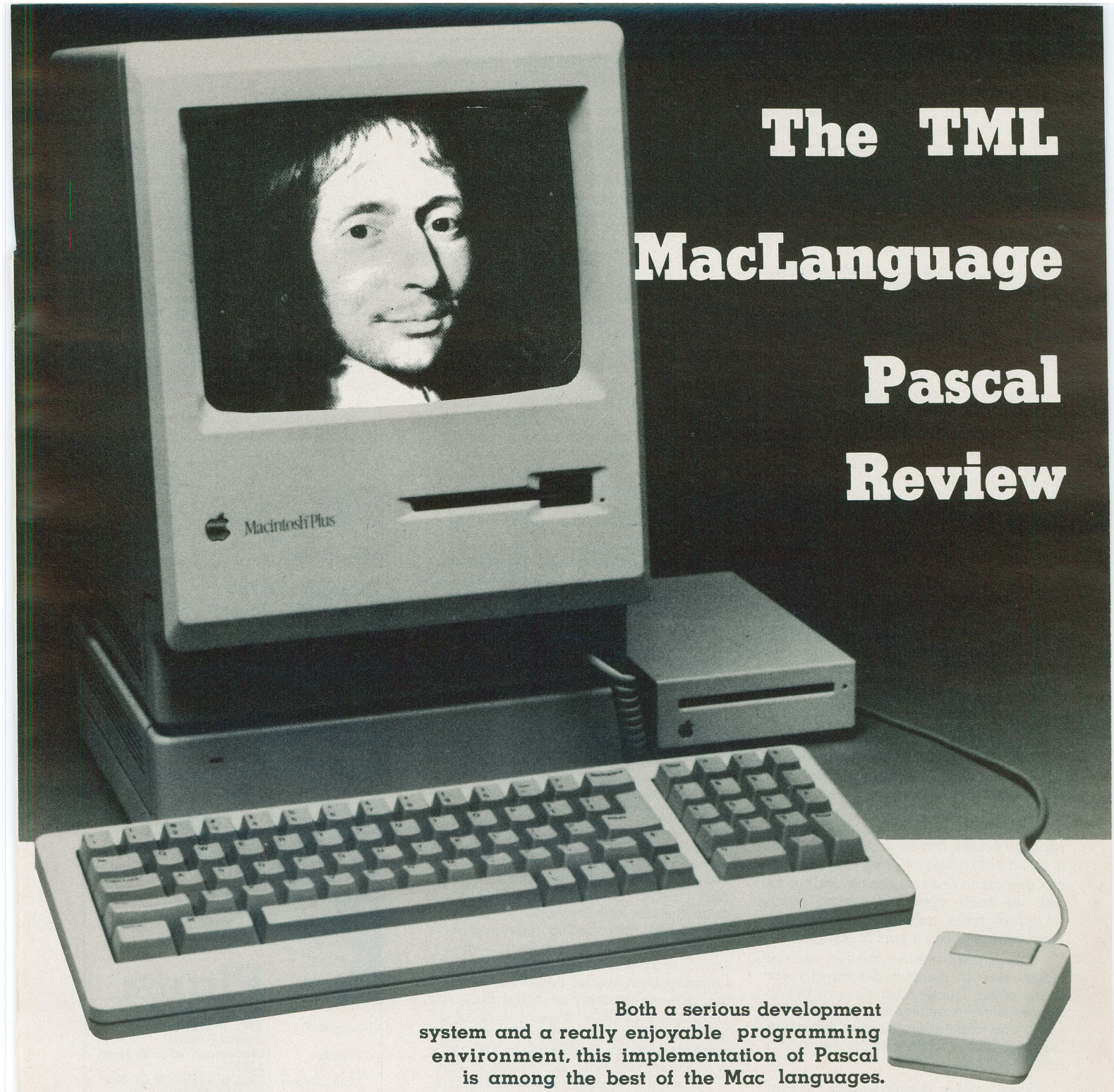
The TML MacLanguage Pascal Review



Both a serious development system and a really enjoyable programming environment, this implementation of Pascal is among the best of the Mac languages.

by S.R. Ferrybridge

The difference between a good language package and a mediocre one is often the factor that determines whether one gets whatever one is writing completed. The nature of a good package is a bit amorphous. Certainly it requires a good compiler with a rich and accurate implementation of the language in question. A decent editor is essential, as are debugging tools in many cases. Finally, reasonably intelligible documentation should find its way in there some place.

There are a very few language packages which manage all of these things.

MacLanguage Pascal from TML Systems is one of the few languages for the Macintosh that really makes it as a decent development system. It's a very powerful Pascal compiler with all sorts of support features. It's well thought out and extremely well documented. It also comes with a few very interesting surprises, not the least of which is on line programmable verbosity.

Differencing Engines

As noted elsewhere in this edition of Computing Now!, while Pascal may or may not be your idea of the perfect programming language, it was that of the people who wrote the Macintosh's voluminous operating

system. As such, for any other language... such as C... to speak to the Mac involves a degree of translation and compiler machinations. It also means that the standard reference for the Mac, *Inside Macintosh*, will be most intelligible to Pascal programmers.

Pascal is a lot easier to use on the Mac for this reason. The best Pascal compilers will usually produce faster, tighter programs than will the best C compilers, for example, because they need spend less time juggling between their own internal representations for things and those of the Macintosh's system.

The MacLanguage package consists of a really well integrated effort. There are several modules one normally walks through in editing, compiling and linking a program... under MacLanguage Pascal these can all be called from menus within the other bits, allowing one to avoid bouncing in and out of the finder between performances. This speeds things up considerably.

Editing a Pascal source file will be pretty easy for anyone who's used the Mac for a while. The editor... it's the standard Mac editor that's found in most languages... behaves pretty much like MacWrite, but it generates text files rather than MacWrite documents, and, as such, lacks many of the formatting features of a true word processor. This is fine... they're useless in this application anyway. What it does offer, however, is multiple text windows so that one can have two files on hand at once.

This is part of one of the really splendid aspects of the MacLanguage package. While most compilers spit out screenfuls of error messages if one commits a lexical transgression in one's source file, this package copies them to an error file. Thus, in going back to repair one's *faux pas*, one can open both one's source file and the file with the error messages, ending hastily scratched notes and other hieroglyphic mnemonics so often a part of compilers.

Having edited a source file one can mouse over to the compiler directly and start it going. There's a fair bit of rodent activity involved in getting the compiler under way... one might well wish for a batch type language after a while. Such is the price of user friendliness.

The compiler normally wants to compile to a relocatable file, which is what it hands over to the linker. We'll get to that in a minute. It will, however, generate assembler code if you want it to. The package doesn't come with an assembler, and normally doesn't have any need of one, but, if you wish to acquire one elsewhere this option is useful for being able to fiddle with one's Pascal code at the assembly language level.

The compiler also allows one choose between creating applications and desk accessories.

Finally, the compiler will optionally install debugging code in one's applications. Once again, this involves some software that doesn't come with the TML package. One must acquire a separate debugger, such as MacsBug or ICOM Solutions' TMON. The lack of a debugger is a limitation in the package, especially if you're used to having this facility.

Successfully compiled relocatable code must be subsequently linked. This stage turns it into actual object code and adds to it any optional files that it might require to interface with the Mac. This also allows one to divide larger programs into small, convenient sized object modules which can be linked together.

There is a final stage... an optional one... which involves the use of a resource compiler. This is only required if the application you're writing includes some resources. In most cases it isn't involved.

The complete process of editing to booting a final application under MacLanguage is a much more involved one than would be the case under a C compiler... which can be set up to handle everything in a batch file. However, the less bizarre syntax of Pascal and the rather more comprehensible nature of Inside Macintosh for a Pascal programmer will probably compensate for this.

Applying the Mac

There are three basic types of things that the compiler will produce. The simplest is what the package calls a "plain vanilla" program, something which uses none of the Mac's internal routines, but is written solely in standard Pascal. Sounds exceptionally dull, to be sure, and such a thing will rarely have much practical use on the Mac.

The most useful class, the second one, is that of Macintosh applications. The third group is desk accessories, which must be installed in one's system after their creation... using DAM or something similar... and thereafter run from the apple menu.

Perhaps the most important thing about the package is that it's just oozing with example programs. These are superb for illustrating how various things are handled, and also serve nicely as boiler plates for one's own stuff. It's a lot easier to simply inhale one, rip out its current bits and install some of one's own choosing than it is to type in all the hand shaking code from scratch.

The actual implementation of Pascal in the package seems to be bug free and is a very faithful version of the language. This probably requires a bit of elaboration... it does everything that Pascal should, and quite a bit more, because so called "standard" Pascal can't do enough to actually create useful real world programs. In addition to this, of course, MacLanguage Pascal allows one to call all of the Mac's four hundred and fifty or so internal routines.

Some of things that come with the package are unusually neat... and, oddly, rather poorly advertised. Among these is 3DQuickDraw, which is pretty well what it says it is, a set of Macintosh graphics routines that implement three dimensional images.

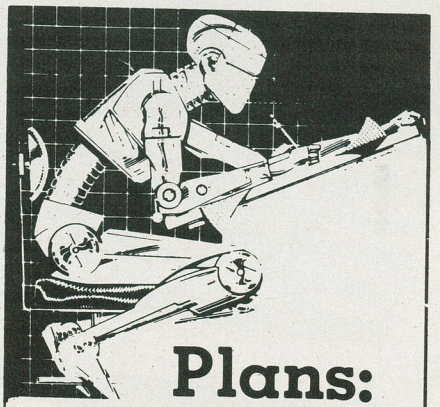
One of the most potentially interesting bits is MacinTalk... not to be confused with AppleTalk, the Mac's attempt at a local area network. This is a package which allows programs to utter actual English words through the Mac's internal squeaker speaker. Now, the words aren't all that human sounding, and MacinTalk does make a lot of mistakes if it's asked to read straight text. However, it's an enormously powerful programming widget, especially as it can be implemented in one's own programs.

It is worth noting, however, that one must get the blessings of Apple if one wants to distribute code which contains MacinTalk.

Finally, I should mention the TML manual which comes with the package, a superb and easily comprehensible book and reference guide for the package. While one will still have to acquire a copy of Inside Macintosh to make any practical use of the compiler in the context of the Mac, this book is a great bit of documentation for the compiler itself.

Through the Pas

The TML MacLanguage Pascal implementation is an impressive little brute, replete with engaging things to play with and still capable of developing serious code. It's all well thought out and what it finally spews onto one's disks is very tight and very fast.



Plans:

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System:	**Macintosh with at least 512K**
Manufacturer:	**TML Systems, P.O. Box 361626, Melbourne, Florida 32936, (305) 242-1873**
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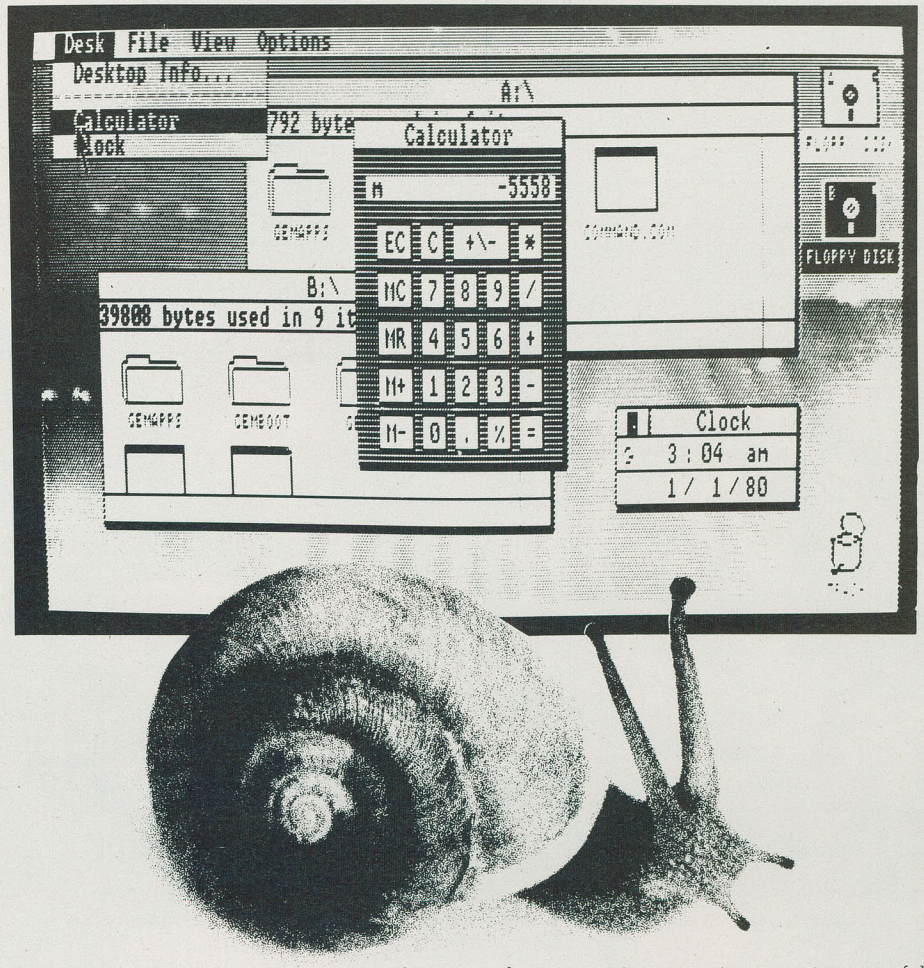
by Frank Lenk



MS-DOS is quite a comfortable operating system. It conveniently combines the simple file handling functions of CP/M with many of the more powerful capabilities of big time systems like UNIX. Even so, not everyone feels up to dealing with all the complexities of the "raw" system... at least, not all the time.

One of the things that endeared UNIX to so many users was that system's capacity to run "shell" programs. As the name implies, a shell is a software supersystem that overlies the actual operating system. Generally, a shell will act much like a language interpreter: it takes the user's commands and translates them into system responses. The shell is responsible for any sort of "user friendliness"... or the absence thereof.

In MS-DOS the default shell is the COMMAND.COM program found on every bootable disk. This 17K file loads automatically along with the two invisible DOS files on the disk, arbitrarily dubbed IBMBIO.COM and IBMDOS.COM in the PC-DOS dialect. The latter two files do all the hard work: masterminding disk I/O, managing memory and other exotic stuff. COMMAND.COM has the relatively simple task of taking command line input... words like DIR, COPY, REN... and invoking the lower level processes required to produce a satisfactory result. COMMAND.COM does some processing of its own and adds messages, to pretty things up.

Command line input is not hard to understand, being based on a language most of us mastered early in life: English. On the other hand, everybody will forget a keyword now and then. Furthermore, command line interaction is keyboard intensive. Not all of us are touch typists.

The inevitable upshot of these constraints has been the development of a thriving trade in third party shell programs. There are now three major front end systems for the PC: GEM... the Graphics Environment Manager... from Digital Research, Microsoft Windows, and IBM's own Topview.

These are not what you'd call "utilities", to be cast aside when you're done with them. If you're using one of these shells, that shell is the what you boot into in the morning, what you see every time you change applications right through till you turn your machine off at night. It's kind of like being married.

How well you react to these programs will depend on two factors: your personality, and your equipment. First of all, you'll find that it's not easy to cram one of these massive environments onto floppy disks. If you insist on trying it, you'll most likely be letting yourself in for a tedious two or three disk boot procedure.

Assuming you do have a hard drive, you'll next find yourself craving a mouse. Graphics interfacing is based on a "point and shoot" approach. Cursor keys are too slow, and single key commands tend to be just as inscrutable as the DOS commands you've been struggling to avoid.

Suppose you have a hard disk and a mouse. Display capacity is also a consideration. Neither GEM nor Windows will display colour on the old fashioned graphics adapter. You'll need to spring for something like IBM's new EGA... Enhanced Graphics Adapter... in order to see colour. On top of that, many cheaper colour monitors may fall short of the resolution you'll need to make the whole mess bearable to stare at. The EGA adapter has its own overheads, so you might as well pick up a whole new high speed computer while you're at it. The AT... or a compatible... should begin to get things moving along at a better clip.

Still, it's worth taking a run through these high power shells... if only because they almost certainly give us a hint of what the future of computing is going to look like.

A Rare GEM

GEM, from Digital Research, is a true clone of Apple's avowed "new standard" in user

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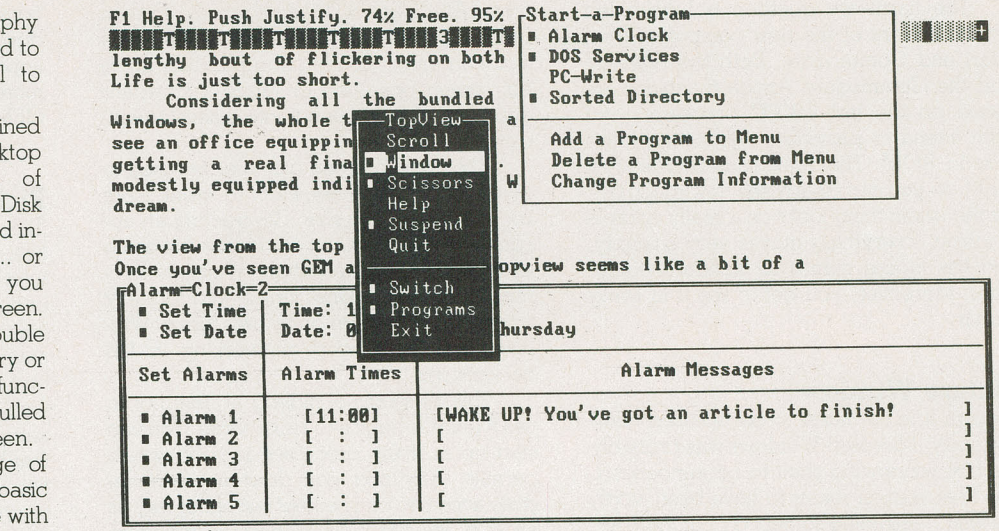
friendliness. It stuck to Apple's philosophy so closely, in fact, that Apple felt obliged to complain... eventually causing Digital to make some minor cosmetic changes.

Essentially, though, GEM has remained a good rendition of the simple desktop metaphor. The entire mechanics of MS-DOS are represented graphically. Disk drives, files and directories are translated into little graphic icons. Using a mouse... or cursor keys, if you're a real diehard... you guide a little pointer around the screen. Point and click to select something, double click to open... that is, to open a directory or run an application. More specialized functions appear on menus that can be pulled down from a bar at the top of the screen.

GEM certainly has the advantage of simplicity. Once you catch on to the basic concept you can pretty much dispense with the instructions and just go on instinct.

Any application can be run from GEM with no penalty except whatever RAM the resident VDI graphics drivers take up. New applications are free to take advantage of the GEM graphics hooks. The low price of GEM... roughly fifty dollars, *retail*... makes it an attractive front end for developers. Programmers can save a lot of time and effort by using the standard GEM interface, rather than designing their own custom



Topview's screen.

structures. There's been no great flood of GEM software, but Batteries Included has been preparing the Isgur stock portfolio management package for both the PC and the new Atari ST, and speaks highly of GEM as a programming shortcut.

Few others seem to be following this lead. In the PC market, I'd have to conclude that hardware is still the weak link. GEM may be cheap, but hard disks are still mainly in the purview of big business users. My experience of big business is that it has little patience for cute graphic metaphors, and prefers to maintain a deliberately drab front.

GEM is the only one of the three major shell environments that doesn't bother with multitasking. The only benefit it tries to provide is the friendly graphic interface itself.

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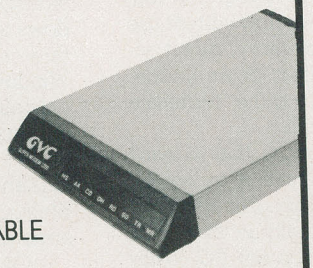

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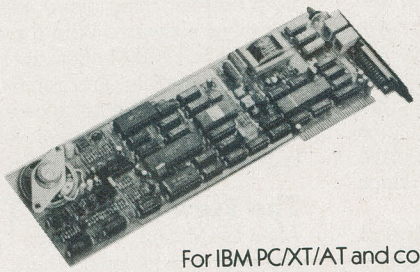

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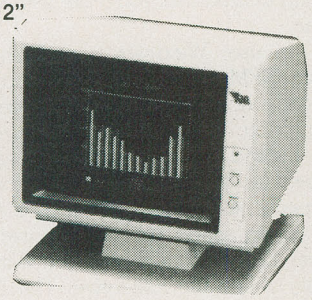

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The hardware question is highlighted by the advent of the new computers from Atari and Commodore. Both the Atari ST and the Commodore Amiga machines are based on the fast 68000 processor, and both intend to provide a windowing interface in ROM. The Atari runs off the shelf GEM, so you can clearly see how much better the whole thing looks on a really suitable machine. Everything moves very snappily, and the mouse comes as standard equipment. Moreover, you get to see it in living colour.

Picture Window

Though it is the latest to be released commercially, Microsoft Windows was probably the first windowing shell to be announced. The final version seems to have been worth the wait... assuming somebody out there actually *was* waiting.

The complete Windows package is an environment itself: a complete MacWrite type wordprocessor, a reasonable MacPaint type graphics program, and a mess of smaller Desk Accessory type utilities. The latter include a cardfile, calendar, notepad, calculator and the best implementation of the game Reversi... also known as Othello... that I've ever seen on a micro.

Windows is not actually based on "windows" as we have come to understand the term. The metaphor used is more correctly referred to as "tiling". The Windows windows are smart enough to always fill up your entire screen, like electronic floor tiles. A newly opened window will elbow the existing ones out of the way without ever revealing any underlying "desktop" surface. This certainly maximizes screen utilization. However, it doesn't really give you the same flexible control over *how* the screen is being utilized that you'd get with GEM or a Mac.

In use, Windows is enough different from GEM to be quite confusing if you're already accustomed to the standard Mac approach. You don't see disk drive icons at all. Instead, your available applications are shown as icons along the bottom of the screen... taking up a rather drastic amount of screen space. To run programs or do other DOS functions you run a subsidiary utility called the Executive. The Executive itself is closer in operation to the Mac desktop than Windows is as a whole. Since Windows is concurrent, you can keep the Executive around all the time, ready when you need it.

Applications under Windows can be in one of three forms. Initially they show up only as files on a disk, seen in the Executive directory listing. Once you run them, programs can be either displayed in a window or contracted into a little icon at the bottom of the screen. By hitting Alt–Tab... or using the mouse pointer... you can select any visible application, whether in window or icon form. Alt–Space will then show the System menu for that application. From the menu you can either Zoom the application up to full screen operation or Move it to where you want it, then open it into a smaller window.

The System menu can later be used to resize the visible windows or to shrink them back down to icon size. Contracting an application window is by no means the same as quitting that application. Windows promises true multitasking. Unless you formally terminate a program on its own terms, Windows will let it keep on working in the background.

This all seems confusing at first, but in use it quickly begins to make sense. You can start up as many processes as your system permits. Anything you don't need immediate access to can be kept out of the way as an icon, leaving more screen for important stuff. Using Alt–Tab you can flip around among your open windows, or select icons to open up. Full fledged Windows application will have their own menu bar, with associated pull down menus. The System menu, either drops down from the far right corner of the window or pops up out of the top of its icon.

You'll find that very few MS–DOS applications are willing to be crammed into a Windows window. A true Windows application is identified by its ".PIF" file. This specifies how much RAM the program will need, and whether it will need direct access to the screen or other memory. The following characteristics identify programs that definitely *can't* run in a window: direct use of screen, direct use of memory, direct access to the keyboard buffer, or an inclination to stay in memory using the "terminate but stay resident" DOS call.

As you might imagine, that doesn't leave much. Still, the situation is not all black. Most well behaved programs will run *from* Windows, if not actually *in* them. For instance, my first attempt to get PC–Write going resulted only in a blank white screen. After specifying that the program needed access to the keyboard buffer, I found that it ran quite normally, but ignored Windows completely.

Many small programs will function well using the PIF defaults, without their own specific PIF file. Even so, there are drawbacks. For instance, I tried running a tiny sorted directory utility on my floppy disk system. It worked, but resulted in a lengthy bout of flickering on both disk drive indicator lights as Windows shuffled things around. Life is just too short.

The real key to the success or failure of Windows will be application support. Running Windows purely as a friendly file manager is probably not worth the trouble. If all you want is file management, GEM is friendlier and simpler. If you want multitasking, Topview would probably be a better bet. However, a batch of serious applications all running in total harmony with Windows would be quite a sight. Given the right applications software, Windows could be a more powerful environment than either GEM or Topview.

Pick Of The Litter

There's a persistent rumour that IBM would like to burn Topview into ROM on some future release in the PC line... presumably once users have become resigned to the idea. This represents a strong movement away from the familiar command line A prompt. As a permanent fixture, Topview would not be unbearable. However, the name of the game is *choice*. The beauty of that blank A prompt screen lies in its potential... the potential to become anything the user desires... even Topview or Windows, if that's what turns the user's personal crank. Nobody should be forced to live inside a graphic straight jacket.

In this regard it is well to note that the Amiga has attempted to provide both windowing and command line interfacing as standard equipment. Even on the Atari ST, where GEM was intended to be as much of a fixture as the desktop is on the Macintosh, there is already available a quasi CP/M command line interpreter.

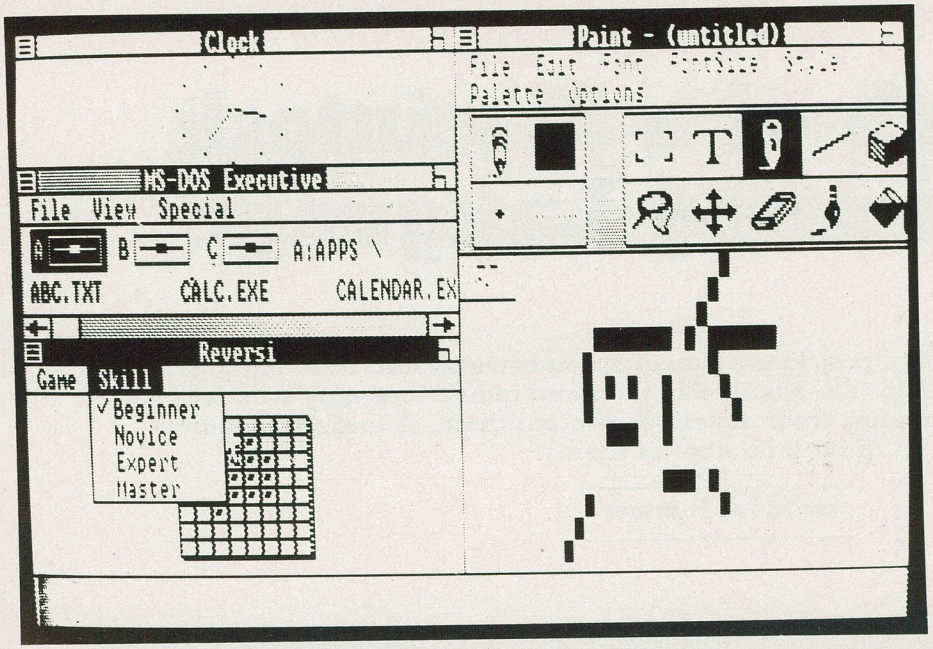
Assuming you really are sold on the idea of a shell environment, which is best? Of the three big name shell systems, Windows seems to promise most. It's got user friendly graphics and multitasking integrated to a tee. Yet as things stand, Windows is probably the least functional of the three shells. The software that comes with Windows is wonderful, but it's probably the only software anywhere that can use the environment to its full potential. If more Windows compatible programs become available... and a few have been announced lately... then Windows could begin to realize some of its impressive potential.

On the other hand, by making logical compromises both GEM and Topview offer more immediate usability. GEM does a great job of providing user friendly graphic DOS management, while Topview puts multitasking functions at your fingertips. Both do their thing nicely with existing applications software. With the advent of the Atari 520 ST, GEM offers the further advantage of portability. Programs developed for GEM will be able to access two markets simultaneously, and users will be able to take advantage of the crossover.

The View From The Top

After GEM and Windows, Topview looks like a bit of a letdown. There are no pretty little icons: this one's all IBM, and IBM means business. Topview doesn't even act much like GEM or Windows. In practice, it turns out to be more like Sidekick.

Under GEM, once you start up an application you lose sight of GEM entirely.



Window's screen.

How much GEM you see is entirely up to the individual program. A true GEM application must put its own hooks into the VDI interface to provide you with the pop up menus and other paraphernalia. Topview, on the other hand, is designed to hang about in the background and is easily invoked from inside almost any application. Both GEM and Windows run in graphics mode in order to provide all those little icons and other goodies. Topview sacrifices the seeming transparency of combined text/graphic display, but co-exists much more effectively with existing text based applications.

Operating Topview is not difficult, once you get the knack. However, as with all three of these shells, the presence or absence of a mouse becomes something of a sore point. For the mouseless ones among us, Topview is still fairly tractable, but certainly not as instinctive as it should be.

There are only four new key functions to learn... but they're strange ones. Holding and releasing ALT... just ALT... pulls up the main Topview menu. This shows in inverse video, for all the world like a Sidekick window. You select options using the Home and PgUp keys... 7 and 9 on your numeric pad... in much the same way as in GEM. These two keys substitute directly for the two mouse buttons, an easy substitution to comprehend.

Pushing and releasing CTRL without hitting any other key will produce a two tone beep and will toggle your cursor in or out of Topview mode. In Topview mode the cursor is used for making selections, cutting and pasting, and similar shell functions. Unfortunately, when using a CTRL intensive program like a word processor you've got to be light on your fingers to avoid accidentally getting lost in the wrong mode. If you hit CTRL and another key you're okay. The trouble comes if you begin a CTRL operation then change your mind and release CTRL without hitting anything else. You have to get used to hitting CTRL again quickly as soon as you hear the beep. Otherwise you'll end up wondering why your keyboard seems to have gone dead.

The ALT menu is mercifully brief. There are two sections. The top section shows helpful functions like Help and Quit. Choosing the Window option brings up a little sub menu which lets you Move, Size, Zoom, Unzoom or Hide your currently active window. Most of these selections make sense only with truly well behaved Topview applications that will run in windows. With most applications the screen is an all or nothing proposition, so you'll only be able to Hide. Inevitably, there'll be other limitations as well. For example, in PC-Write I lost my help screens, which normally load into the unused text pages of the video display.

Picking Suspend from the main ALT menu is much like hiding your window, except that it also puts your program on hold. This is where you begin to notice the multitasking part of the system. Picking Switch will give you a menu of already active programs that you can move among. The ones you pick will only take as much of the screen as they need. Thus the ones that are willing to run in windows will simply overlay whatever was going on before... unless you explicitly choose to Hide it.

Picking Programs will bring up the primary Topview Start-a-Program menu. This is where you get to start new applications, until you run out of room in your system at least. On this and other Topview menus the available functions are marked with a square bullet. Inactive ones lack this mark... the equivalent to being greyed out on a Mac or GEM pulldown. My major complaint with Topview is that all too often I found myself unable to get back to a particular option. Over and over I'd get into the appropriate menu, taking a different route each time but always finding the required item tantalizingly unbulleted. This sort of trouble is almost inevitable once you get enough applications running around all at once, but Topview still seems to have a minor quirk or two about dealing with the pileup.

One of the major selling points of both Topview and Windows is multitasking... the ability of your computer to do more than one thing at a time. If this is really what you're after, the AT becomes a necessity. In writing this article... on a plain old PC clone... I tried running my word processor under Topview. After starting up two background copies of the Topview Alarm Clock... a simple timer utility... I found that the cursor was frequently falling out of step with my typing. Unless you're very careful in pairing up your concurrent applications, you're bound to have trouble.

However, Topview has one big advantage: it's not very big. Topview is by far the smallest of the three shells, fitting comfortably onto a single floppy disk. Both GEM and Windows are a two disk effort at minimum. **CN!**

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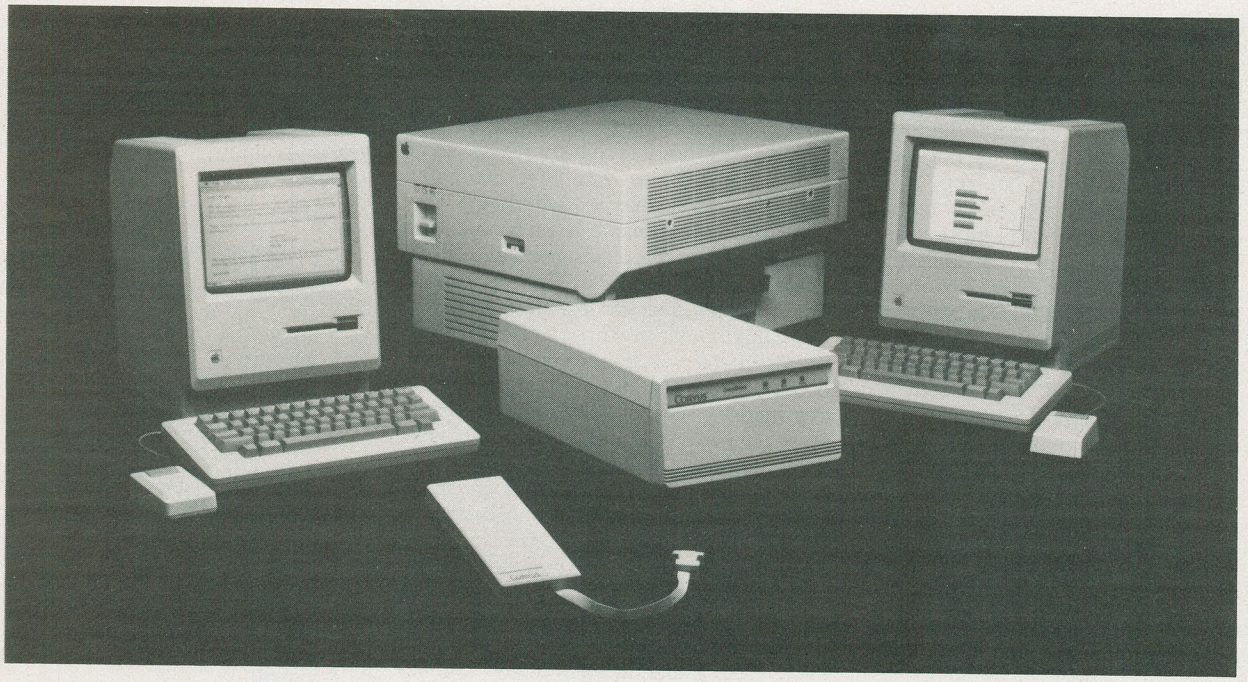
In Search of a Macintosh Programming Language

With a world full of graphics programs, games, spreadsheets, data base managers and electronic cook books for the Macintosh, the more industrious may wonder if there might be a programming environment or two out there. Actually, there are quite a number of them.

by Steve Rimmer



The Macintosh is at once a really powerful box full of chips and, at least until very recently, a frustrating apparition for anyone even imagining programming the little monster. It has the stuff of dreams in there, a fast processor, a rich if somewhat funky operating system, suitably peculiar I/O and even a decent screen display. All it ever really lacked was a workable... available... programming environment.

The Mac is one of the few computers one sees without any sort of native programming tools attached to it at all. Even CP/M came with an assembler of sorts. The stuff one could get from Apple to compensate for this has been long in coming and rather disappointing. However, by comparison, some of the third party development systems have been fairly brilliant.

In this feature we're going to have a look at what one can get into to program the Mac. There is quite a range of things, from BASIC right on down to several assemblers. Most are relatively inexpensive, and many have things which commend them very strongly indeed.

BASICly Speaking

Most microcomputer users start programming in BASIC... and many never leave its tender embraces. It's quite understandable... Microsoft's BASIC implementations are among the richest languages on the planet. They're very forgiving, very powerful, well debugged and documented and quite a lot of fun.

The initial Microsoft BASIC for the Mac had the distinction of being just about the only sort of programming tool one could get for the beast... but that was about all. It wasn't a very powerful development system, lacked access to most of the powerful aspects of the Macintosh and was generally pretty pedestrian. By comparison, the version two BASIC which supplanted it is one of Microsoft's best bits of software to date.

Microsoft's Mac BASIC is a little strange if you're into traditional BASIC, borrowing, as it does, from a number of other languages. For example, line numbers are optional, and can be replaced with text labels, which are far more mnemonic. Sub–programs with local variables are implemented, as is a certain amount of direct access to the Mac's QuickDraw graphics package. The language contains some simplified implementations of things like controls and dialog boxes, which make it

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relatively simple to write programs that behave like standard Macintosh style applications.

Writing programs under Microsoft's BASIC is about as much fun as one can have with a computer that doesn't have a coin slot in its front. It's supremely interactive, making debugging even long programs pretty painless. One types one's programs into an editor which behaves more or less like MacWrite. If you do something it doesn't like it stops interpreting your program, scrolls the text window to show you the offending line and draws a box around it.

The package is typically well documented and extremely easy to get into. Boot it and you'll be programming your brains out in half an hour.

It's hard to regard the Mac as a serious business system... and it's even harder to regard Microsoft's BASIC for it as a tool for developing business applications. While it has a good selection of the sorts of things one might want to do this, disk handling, screen formatting and so on, it lacks the speed to make such things practical. As of this writing there isn't a compiler available for it, which means that one must distribute a BASIC language run time if one wants to distribute BASIC applications. Microsoft does do something like this, but the whole affair starts looking somewhat involved.

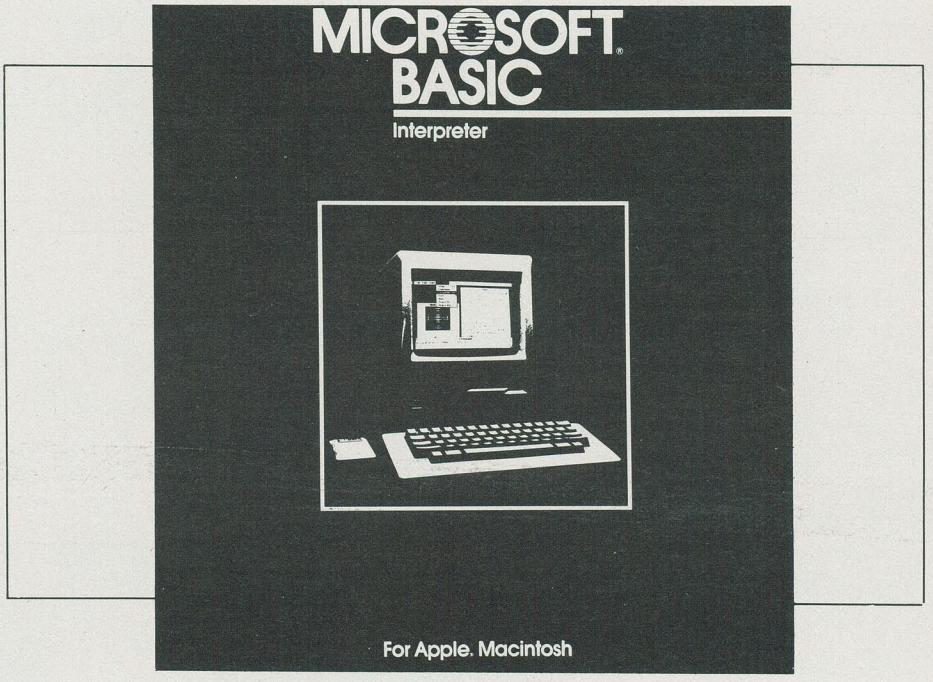
In reality, though, while the ease of developing programs with BASIC is joyous, the speed of most programs that one does with it is such that the whole party, if left without a compiler, can't really be regarded as much more than an enormously well executed programmer's day dream, profoundly enjoyable to use but not really suitable for writing large applications.

Pascal's Law

Having hit a bit of a wall with BASIC I started looking further afield... into the realm of the strange little languages that have spewn forth for computers over the years. Actually, I tried out C before I ventured into Pascal, but this is supposed to be coming down in a logical order of a sort. We'll get to C in a moment.

Pascal actually seemed to be the perfect choice for the Mac as, while it is a bit strange as a programming language, it is what all the Mac's system files were written in. As such, the massive two volume "Inside Macintosh" programmer's guide which describes the Mac's internals is more or less intended to make sense to Pascal programmers.

Because the Mac was developed in Pascal... admittedly, in Lisa Pascal... it seemed logical that there would be a Pascal implementation for the system forthcoming from Apple itself, and I eventually got them to admit that such a thing was in the offing. It eventually showed up in a really slick looking box documented half way into a paper explosion. The official MacPascal package comes with three... count 'em... manuals and a disk.



The disk, perhaps not surprisingly considering its origins, is severely copy protected. In order to back it up one must buy Copy II Mac if one doesn't have it already, which makes the whole effort a bit more expensive. Yes, there does seem to me to be an element of foolishness in this, but, then, I'm not a corporation.

While it initially appears to offer whole new vistas of exploration in the frontiers of the Macintosh's facilities, MacPascal turned out to be not without its disappointments. The first of these was unquestionably that it is a Pascal interpreter, rather than a compiler. This is analogous to BASIC, which is also an interpreter. In other words, it doesn't produce stand alone applications, but, rather, only source files which must have MacPascal available to run.

MacPascal is almost as much fun to write in as is BASIC... it's extremely friendly and very forgiving. Not only does it highlight one's errors... it even draws a picture of a bug beside the error messages. However, the drawbacks of BASIC... primarily those of speed... are just as well ensconced in MacPascal. It actually ran slower than BASIC on some benchmarks.

One of the things that seemed to be very promising with MacPascal as opposed to BASIC was that it seemed like it should allow one a convenient way of accessing all of the Mac's internal routines... there are about four hundred and fifty of them at the moment. This would seem to offer one the option of playing with these things in fairly safe surroundings and with the flexibility of an interpreter.

In fact, this turned out to be sort of true. While MacPascal does support more system calls than does BASIC, it doesn't directly manage anything like the full house of what the Mac can do. What it does offer one is a new command called *InLine*, which permits one to access routines that it doesn't strictly speaking want to know about.

The InLines do let one get at all of the workings of the Mac, although there's a lot more typing involved in using this feature. More to the point, however, is that there is no syntax checking performed by MacPascal on InLines. If you do something wrong in using the InLines your program will almost certainly crash the system, requiring that it be rebooted. MacPascal is a slow boot.

In initially playing with MacPascal I thought of it as half of a really spectacular development system. I envisioned developing programs in the comfort of the interpreter and then compiling them with a Pascal compiler. This can... theoretically... work, but only if you don't need any of the Mac system calls that would have to be accessed under MacPascal through the aforementioned InLines. The Inlines, not being standard Pascal, wouldn't be recognized by a compiler.

Another great idea went into the black hole.

There are two Pascal *compilers* that I know of for the Mac. The first is a very serious development system which Apple produces for software developers, the Macintosh Development System. I never actually did find out who you have to be tight with to get one... suffice it to say that I wasn't tight with any of the right people. By comparison, being prepared to part with a few bucks is all you need to get into in order to own TML MacLanguage Series Pascal. Having played with this package... and, admittedly, only read about the Apple compiler... I think I'd have favoured the TML compiler even if I could have had a choice of the two.

There's a more detailed review of the compiler in this edition of Computing Now!.

For the first little while Hippo C looks pretty slick... it's easily the most painless way to initially play with C one can think of. However, some of its limitations are quite severe. For example, the level one version of the program cannot produce stand alone applications... they must be run under the shell. As such, one can't distribute what one writes with it... except to other Hippo C owners, I suppose. The level two version, which is considerably more expensive, does produce stand alone applications, but it's a bit of a labour to get it to do so.

There are a number of aspects of "standard" C that Hippo C doesn't support. Most compilers cheat on the standard Kernighan and Ritchie C a little bit, but Hippo C has omitted some very useful bits. For example, it doesn't support floating point variables, at least, not in C. There is a way to convert between C variables and Pascal representations of them so that one can make direct calls into the Mac's SANE arithmetic library, but the whole process is really weird, agonizingly slow and poorly documented.

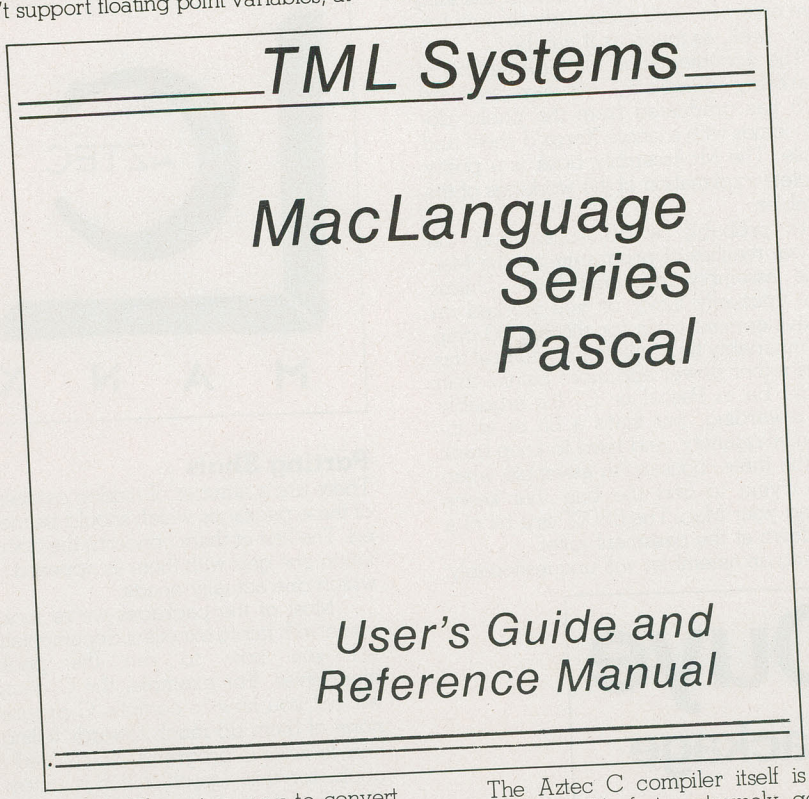
Hippo C disdains from passing structs... lots of compilers don't like doing that, admittedly. It also doesn't support doubles, which is a severe limitation for some sorts of programming and something which shouldn't be that hard to implement.

Finally, Hippo C is distributed in a copy protected form. You have to send the lads at Hippo an extra fifty dollars for an unprotected version.

The remaining two C compilers, Aztec C and DeSemet C, are kind of tied... if you choose one over the other it will probably be determined by your ability to use them rather than their overall facilities. I've more or less settled on the DeSmet package, but my reasons for doing so aren't particularly incisive.

The primary advantages of the Aztec package are its extremely tight object code when the dust settles, its ability to create desk accessories, something which the DeSmet package doesn't seem to be able to do, and its exhaustive documentation. It is a very powerful compiler, and is as full an implementation of C as one is likely to find.

The manual for Aztec C is a bit of a paradox... it's easily one of its greatest assets and one of the things that will scare many users into a coma. Almost two inches thick, it's ponderously verbose, and yet, lacks an index. It will tell you everything you could ever want to know about the package, but it does require a good evening's read first. It's a masterpiece of a resource, if a bit foreboding at first.



The Aztec C compiler itself is really pretty good. It's fast, extremely good at spotting errors and renders tight, fast code. There is little more one could really want from a compiler. The shell that comes with the system is the most Unix like of any of the ones I tried... this may or may not be an asset to you. It has two editors... a small, fast line editor and a mouse based one that behaves more or less like MacWrite. I'll speak a bit more on this latter editor in a moment.

I think that the Aztec compiler is the right choice for someone who wants to have the most powerful C programming environment possible and doesn't mind paying the price of doing a lot more work to use it.

I'm not quite that idealistic.

The final thing I should say about the Aztec package is that it is copy protected.

The DeSmet compiler is, I think, the best straight up compiler of the lot. It's combined ease of use and a powerful C implementation in just the right balance. It's well documented without being onerous. It's bug free in so far as I could tell and it's really fun to use.

The DeSmet package supports a pretty full C and is capable of talking to all the internal routines of the Mac. Because of the way it's set up, this can be expanded. If future finders have more entry points one can add them to the compiler's header files and subsequently call them from one's code.

The DeSmet package consists of a two part compiler, a linker and an assembler. You don't usually need the last bit, but it's occasionally handy. The way DeSmet C is arranged makes it unusually easy to link C modules and assembly language modules into a single program.

The DeSmet package is the only one not to come with a MacWrite style editor, although, as we'll get to, you can have one if you want it. The *see* application that serves as its editor is a peculiar little troll that requires some getting used to. It's partially mouse based... and partially derived from WordStar. Many of the WordStar control keys have comparable functions under see. After you've used it for an hour or so it will make sense.

The process of editing and compiling a file... allowing for the disk access times involved... was quickest for the DeSmet package. It can be speeded up quite a lot on a fat Mac if one installs a RAM disk to hold the compiler's scratch files... a RAM disk program is included in the total party. There's also a video game on one of the disks... presumably written in DeSmet C... to give one an idea of the system's capabilities. It's a pretty decent game... and a good measure of what one can do with the package.

One of the unique aspects of the DeSmet package is that it comes with a Macintosh terminal interface package that can be linked into one's own applications. This allows one to treat the Mac's screen in a character oriented fashion if one wants to... handy for text based things.

Other useful bits of the DeSmet package include a debugger and a module librarian.

I think that the DeSmet package is probably the best trip for most souls who want to program the Mac in C. If you aren't going to attempt to rewrite the finder or design a desk accessory to figure pi to the last decimal place you probably won't run out of its capabilities. It's a good chunk of software and a fair value for what it costs.

Jack ASM's

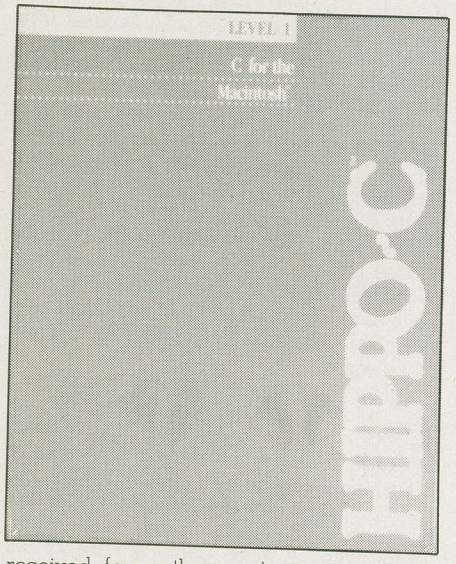
There are a couple of other languages one can have for the Mac, most notably MacFORTH, which I confess I haven't really looked at. One can only keep so many ways to add two numbers swimming about in one's head at a time.

The bottom of the heap... or perhaps the stack... I can never keep 'em straight... is writing code for the Mac at the assembly language level. This may actually be one step below the bottom, depending on how

you look at it. However, while it seems fairly daunting in concept, a decent assembler package can make it practical. There is at least one of these available.

There are, first of all, two available stand alone Macintosh 68000 assemblers, these being McAssembly and MacASM. Yes, it is a bit confusing. We're going to look at the former one, McAssembly, which is done by Signature Software.

The McAssembly package has an interesting history. Its first incarnation was released into the public domain as shareware. It didn't fair too well... it's author



received fewer than a dozen registration cheques. The latest version is only being offered as a paid for package, and is doing rather better. It really deserves to... it's extremely well executed and very reasonably priced.

Actually, a 68000 assembler on the Mac *is* next to useless by itself. Its outlook improves a lot with the right macro libraries and definition files, which can make assembler programming not all that much more treacherous than is programming in C. Not surprisingly, all these ancillary files are part of the McAssembly package. The two disk set also contains a sample application which can serve as a boilerplate for one's own code. There isn't a whole ton of stuff to type in before you get started.

The process of developing programs under McAssembly is very much like working with a compiler. One's code is edited, assembled... and re-edited if there are syntactical errors in it... linked and finally run as an application. There's a rather nice debugger in the system which makes tracking down errors in one's code fairly straight forward... well, as much as it can be.

The documentation for McAssembly is remarkably complete... usually software which has graduated from the public domain comes with a single Xerox'd sheet and a smile. The McAssembly book is a pretty complete explanation of the workings of the assembler.

It's probably worth considering the practical realities of programming the Mac at the assembly language level. Unless you're unusually lucky or you worked on the development team for the 68000 chip you'll invariably find that writing code at this level is rather slower and more painful than it would be in Pascal or C. It's arguably more rewarding, but that's a bit of an insubstantial quantity, and hard to keep track of on the three thousand'th assemble when you're trying to find the bug that keeps bombing your Mac. The 68000 is a bit of a party down at the basement level.

Using an assembler will unquestionably produce smaller, tighter, faster programs than will any other program development process. However, the gains one makes in these areas are not as huge as they might be on other computers. Bear in mind that you'll be writing programs to talk to an operating system that's written in Pascal... it, not your code, will probably be the limiting factor in the speed at which your programs operate.

McAssembly is a really worthwhile piece of software if you want to get every last millisecond out of your Mac. If you insist of writing assembly language code you'll find no better place to do it.

SOFTWARE DEVELOPMENT SERIES
AZTEC C
MANX

Parting Shots

There are a number of hidden catches to all of these packages which should be mentioned. The first of them concerns the documentation one gets with them as opposed to that which one actually needs.

Most of the packages we've looked at come with fair to excellent documentation to tell you how to run the packages themselves. For example, the C compilers will tell you how to compile C programs... none of them do much towards telling you how to *write* C programs. You'll need more books for this aspect of things unless you already know how to program in the language of your choice. This is especially true for McAssembly, which requires an intimate knowledge of programming the 68000. Microsoft's BASIC is something of an exception this... the manual is very good, and you'll probably be able to dig your way through it.

You'll also need to know how to talk to the internal routines of the Mac. None of the packages really offers enough information on this area to make them useable as they stand. This requires a really massive two volume set of notes called "Inside Macintosh", which is available from Apple. It was two hundred dollars when we bought our copy... check it out. There is no substitute for these books if you want to program the Mac.

If you do choose to buy one of the copy protected packages you should figure in the cost of Copy II Mac... relying on copy protected software in an imperfect world is like

DeSmet/Ouye
C Development Package
C WARE CORPORATION

While a bit involved to master all in one afternoon, the TML package offers one absolutely every facility the Mac has to offer. It can be used to write both applications and desk accessories. It lets one work with resources... there's even a resource compiler included with the program. The documentation isn't exactly luminous in places, but it's adequate with a few provisos. We'll get to them in a moment.

TML Pascal does come with numerous sample applications, which is probably the most valuable documentation a programming package can have.

Being a compiler rather than an interpreter, as the previous two packages we've looked at were, the TML Pascal package requires that one go about developing programs the hard way. One writes one's source file into an editor, compiles the program... usually fixing some errors and subsequently recompiling the program... and finally "links" the file that the compiler produces to get a stand alone application. However, what one is left with is an authentic application with an icon and all. This file could be put on another disk and distributed, having no further need of the TML package.

The TML package will be, for many programmers, clearly the most suitable environment for developing code. It's fast, cheap and largely wonderful in almost every respect. It's a bit hungry of disk space... you can't really use it without two drives, and even then things can get a bit crowded if you aren't careful... but almost all the compilers we'll look at here are basically the same in this respect.

The advantages in using Pascal to program the Mac may not be immediately apparent. They'll come to you in time, though. Especially if you're starting off with programming at this level, having to learn a language and convert from the Pascal notation of the Mac's documentation to that of another dialect can be a bit of a head dance.

C for Miles and Miles

All other things being equal, I'd rather program in C. I can't say why... it's a spooky little language and easily the least forgiving thing one can work in short of trying to write stuff in assembler. However, it imposes a certain mental discipline on one's code, and restrains one from a lot of the chasms that less severe languages let one go leaping blindly into.

The stuff of existential programming philosophy, this...

I've tried three C compilers for the Mac to date, these being Hippo C, Aztec... Manx... C and finally DeSmet/Ouye C, which we had some contact with in the February 1986 edition of Computing Now!. The interesting thing about these three is that despite C's supposed standardization, all three are markedly different.

There are a number of things that are common to all the C compilers I've seen for the Mac. Because of the nature of C, compiling a C program involves a minimum of three steps, with a lot of command arguments to be set for each stage in the process. To translate this into something more like Macintosh terminology, one would have to boot at least three applications and click a lot of boxes every time one wanted to take a source file and produce a bootable application from it. This is highly tedious when one is debugging a program, and going through the process multiple times.

The way that all of the C compilers have gotten around this has been to create *shells* for the Mac. A shell is something which does what the Finder normally accomplishes, but in a way which is more conducive to compiling C programs. If one boots a disk with one of these shells on it one... more or less immediately... gets presented with a command line. There are no icons, nothing to click and no menus in most cases. Everything is handled by typing in commands.

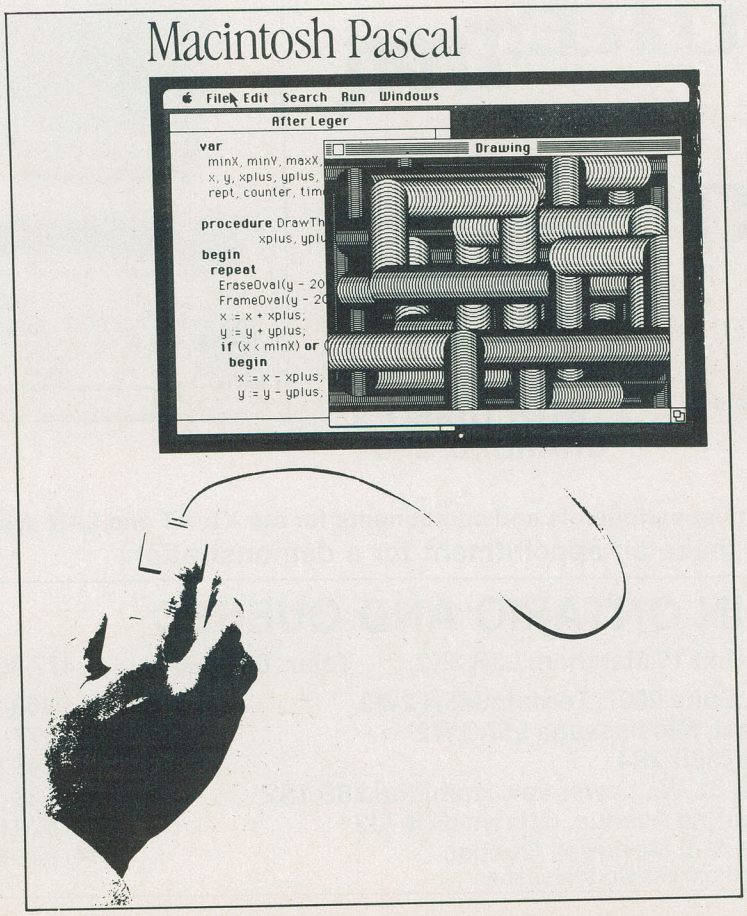
Because C was developed for use in what the real dedicated types call a "Unix like" environment, the commands one normally types are derived from Unix commands, which were specifically selected to be terse and make no sense at all. Under some of the packages one can change commands to ones which are more mnemonic if one wants to.

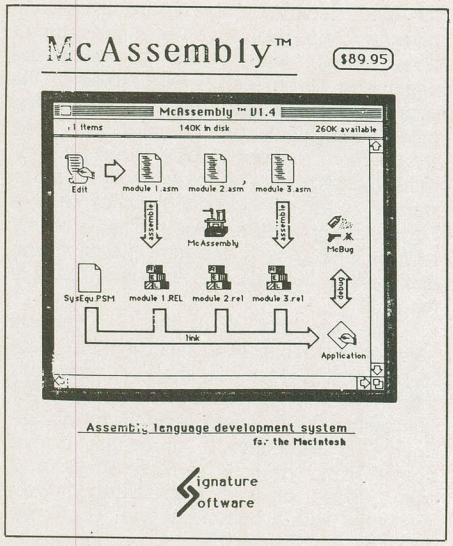
The command to see what's on a disk is universally *ls*. The command *cat* prints files to the screen. There are a variety of commands to invoke the text editor to create or modify files, as are there for the compiler itself.

This probably sounds fairly frightening if you've been into nothing but Macs. It's a bit hairy at first, but it's worlds faster to use once you do get your head around it than is, say, TML Pascal, which requires quite a lot of clicking and moving from application to application. The shells allow the use of *scripts*, or batch files, so that one can invoke the entire compilation process with a single command.

The first package I tried was Hippo C. It was initially quite a party... perhaps because it was the only one I'd found at the time. While it has a lot to commend it, it also has some severe conceptual hangups. It's the most user friendly of the C packages, but even in the more expensive of its two incarnations it's much less powerful than the other two we'll look at.

There is a bit of Manx C in the way Hippo C behaves, and a bit of Turbo Pascal. When one boots it... this package actually boots the shell from the finder... it allows one to bring up a MacWrite like editor which interacts with the rest of the compiler. You can create a program file and compile it from one of the editor's menus. If there turn out to be errors in your file... there are always errors in C files... the compiler will mark them in the source file so you know where they are. There is a special menu option for automatically taking out all the error markers.





trusting a banker when you haven't got a shotgun.

Another useful thing to note is that all of the packages which offer a mouse based editor use the same one, a really splendid little package called *edit* by Bill Duvall of Consulair Corporation. It's in the public domain... and available on one of our almost free software disks... so that if you decide to pop for one of the systems that doesn't feature a friendly editor, such as DeSmet C, you can easily have one at a nominal cost.

The Mac is one of the most fun things anyone's ever devised to program. It has facilities you haven't even thought of meddling with yet, and power that can blow away all sorts of traditional programming restrictions. It's worth the effort to get into.

Some of the stuff one can write would boil the blood of the system's original authors. What fun!

Sources

McAssembly Signature Software, 2151 Brown Avenue, Bensalem, Pennsylvania 19020, telephone (215) 639-8764.

MacLanguage Series Pascal TML Systems, P.O. Box 361626, Melbourne, Florida 32936, telephone (305) 242-1873.

Macintosh Pascal Apple Canada, 875 Don Mills Road, Don Mills, Ontario M3C 1V9, telephone (416) 366-2232

Aztec C Manx Software Systems, P.O. Box 55, Shrewsbury, New Jersey 07701.

Microsoft BASIC Microsoft Corporation, 10700 Northup Way, P.O. Box 97200, Bellevue, Washington 98009.

DeSmet/Ouye C C Ware Corporation, P.O. Box C, Sunnyvale, California 94087.
Hippo C Hippopotamus Software, 1250 Oakmead Parkway, Suite 210, Sunnyvale California 94086.

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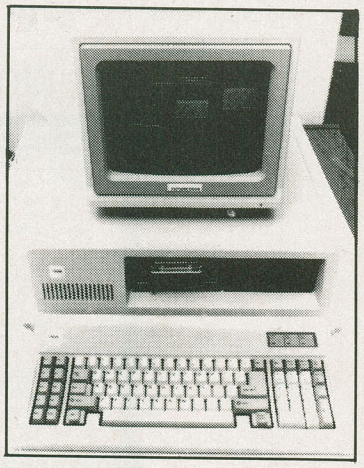

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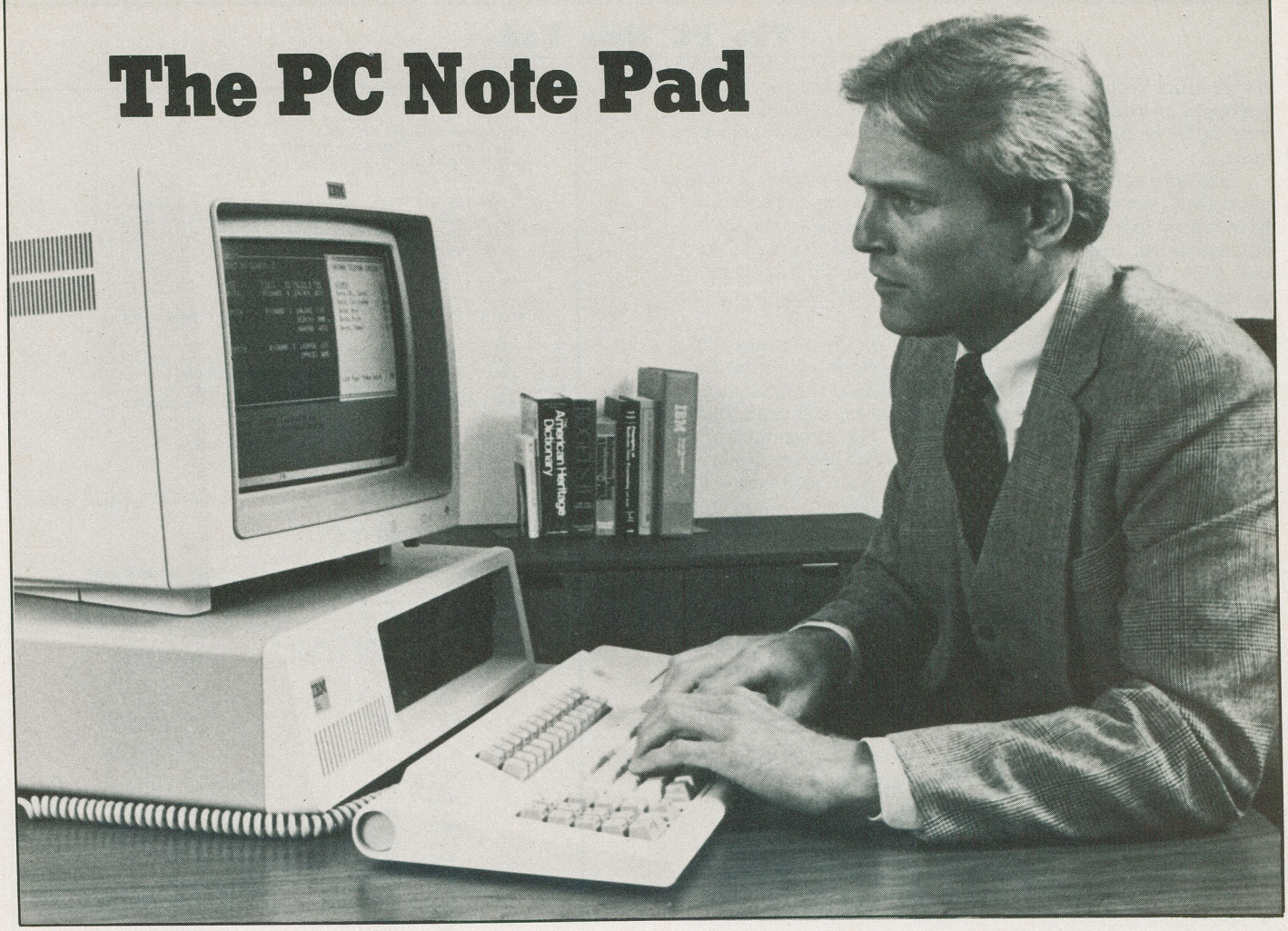
The PC Note Pad



This program for PCs and compatibles will create a resident note pad which you can call up from within an application. Never again need you be buried in scraps of paper and old envelopes

by Steve Rimmer

I recall hearing someone suggest that one day computers would replace paper, and that the temple of doom that resides upon my desk as a kind of permanent cenotaph to legions of nameless jack pines would be banished forever. I also recall someone describing Hondas as cars... the world is full of weird ideas.

One of the things that a lot of people use large volumes of paper for is in notes to themselves. Those of us not accustomed to scribbling on our arms will usually use the next best thing, and do it on the bodies of dead trees. This is part of what leads to paper explosions.

The resident note pad program in this feature is a digital alternative to writing things on bits of paper. It's an on line scratch pad that hides in almost any sort of PC and comes up whenever you need it, even if you happen to be in the middle of an application. Hit a predetermined combination of keys and whatever you're working on will disappear. The screen will be replaced with a one page scratch pad. Assuming that you have used the program previously, it will contain whatever you have previously scratched there.

The page can be edited and re-edited as you think of more stuff to put on it. You can bring it up to look at it pretty well instantaneously whenever you feel like it and send it away when you no longer need it. Sending it away will bring back whatever was running on your system when you called for it, as if it had never been interrupted.

There are a number of commercial programs which include note pads. However, this one is really small... less than two kilobytes long, in fact... and very easy to use. It offers you a full page to scratch on, without any distracting graphics or dialogues. It will keep your thoughts in perpetuity or until you decide that they can be safely cast to oblivion.

Magic Windows

The note pad program has to do a number of things. The most obvious one is that it has to be a screen editor, but, prior to this it must do some low level things to DOS to hook itself into the system.

Almost all programs handle getting keyboard characters the same way. The usual approach to getting console input is to issue a type 16H interrupt, thusly...

```
MOV    AH,0
INT    16H
```

This will cause the computer to jump to the 16H'th entry in

the interrupt vector table in low memory and from there to the keyboard interrupt handler in the system's BIOS. That is, it will wind up in the BIOS unless something modifies the low memory table.

The table entry... what the bald guys call the *vector*... is written in RAM, not ROM as is the BIOS. As such, we can alter it to have it point to a different keyboard handler if we want it to. In the case of this program, the vector gets altered to point to our own code. We don't really want to replace the BIOS routines... we just want to have an advanced peek at what they're going to do before they do it.

The note pad program is booted once, usually by putting it in an AUTOEXEC file. In booting, it installs a hook into the vector table and leaves part of itself permanently lodged in DOS... this is the bit that the new keyboard interrupt vector will point to. It looks for a particular trap key character... I've chosen the combination of *control end* hit simultaneously, which produces the extended key code 075H. You can change this if it interferes with some of your software.

The hook, then, samples the keyboard input before the BIOS gets it. If what it sees isn't the trap, it passes control over to the BIOS, which never really finds out that things are going on behind its back and processes the interrupt request as if everything was normal. The program that initiated the request will get a keyboard character as if there were no hooks. However, if the character which our code sees happens to be the trap, it will go into its dance and bring up the note pad.

This is a very involved sort of special purpose interrupt handler.

The hook installing code is at the bottom of this program. It does two things of import before it disappears... three if you count the disappearance itself. The first is to find the true interrupt vector of the real console input BIOS stuff and save it in our code. The note pad will have to refer everything but the trap character on to the real BIOS for processing. The next thing it does is to overwrite the real vector with one pointing to the note pad. Finally, it executes an interrupt 27H, which causes the program to return to DOS but allows the handler part to stay resident. The rest of it, the hook installer, is trashed by DOS and overwritten the next time something wants some memory.

Having executed the installer, every request from a program or DOS for keyboard characters from the BIOS must go through the note pad's outer defenses for scrutiny.

By the way, there are a very few programs that don't use the BIOS interrupt to get characters. The note pad probably won't work with these... them's the breaks.

Smoke Screen

When the note pad senses a trap character it has to save whatever's on the existing screen, bring up the note pad from a file and plop itself into a screen editor. The screen editor allows one to change the things on the note pad's page. The same trap key that gets one into the pad will cause it to disappear. Upon hitting control end while the note pad is up the program will save the note pad page to disk, restore the old screen and cursor and go to sleep again, waiting for another trap key.

Each of these operations requires a bit of observation to see what it really does.

In order to be able to pop out of a program, meddle with the pad and then return to it, we must save all the program's registers at the time of the request to bring up the pad, its screen and the position of its cursor. The first bit is easy... it's handled by all the PUSHes at the start of the handler. Preserving the cursor is also fairly simple... we just read the cursor location with a type 10H interrupt and save the value somewhere. The screen is a bit trickier.

Each character on the screen consists of two bytes, the odd ones being the characters themselves and the even ones their attributes... usually their colours. With two thousand characters on an eighty column screen this amounts to about four kilobytes of data.

```
                COMMENT -

        resident note pad utility
        copyright (c) 1986 steve rimmer
        hey, dig my pad...


        This code may not be distributed to uncool individuals
        or companies and may not be put to filthy materialistic
        uses without the author's engraved permission. No hand
        drawn facimiles please.

                        -

VERSION         EQU     1       ;VERSION NUMBER
SUBVERSION      EQU     0       ;SUBVERSION NUMBER (BLOODY SUBVERSIVES)

SCREEN_WIDE     EQU     80      ;WIDTH DE TUBE
SCREEN_DEEP     EQU     25      ;NUMBER OF LINES ON DE TUBE
STACK_SIZE      EQU     128     ;HOW MUCH STACK OVERHEAD
TRAP            EQU     75H     ;CONTROL END IS TRAP
TRAP_NUMBER     EQU     16H     ;INTERUPT VECTOR TO BOONDOGGLE

                CODEX   SEGMENT
                ASSUME  CS:CODEX, DS:CODEX, ES:CODEX
MAIN            PROC    FAR
                ORG     100H

START:          JMP     INSTALL_HOOKS           ;JUMP OVER INTERRUPT HANDLERS

;THIS IS WHERE ALL THE WORK IS DONE
PAD_HANDLER:    PUSH    DS
                PUSH    AX
                PUSHF                           ;SAVE ANYTHING IMPORTANT

                MOV     AX,CS
                MOV     DS,AX                   ;SET UP LOCAL DATA SEGMENT

                MOV     [STACK_POINTER],SP
                MOV     [STACK_SEGMENT],SS      ;SAVE OLD STACK

                CLI
                MOV     SP,OFFSET STACK
                MOV     SS,AX                   ;CREATE NEW STACK
                STI

                PUSH    AX
                PUSH    BX
                PUSH    CX
                PUSH    DX
                PUSH    SI
                PUSH    DI
                PUSH    DS
                PUSH    ES                      ;SAVE CONTEXT
                PUSH    BP
                CALL    CONSTAT                 ;IS THERE A CHARACTER WAITING?
                JZ      SKIP_PAD                ;IF NOT, SKIP REST OF CHECK
                CMP     AL,0                    ;IF THERE IS, MIGHT IT BE
                JNE     SKIP_PAD                ;THE TRAP?
                CMP     AH,TRAP                 ;IF NOT TRAP, PROCESS THE
                JNE     SKIP_PAD                ;INTERRUPT NORMALLY

                CALL    GETCH                   ;IF IT BE, TRASH THE TRAP

                MOV     BYTE PTR [ERR_STATUS],0 ;RESET ANY PAST ERRORS

                CALL    ACTIVE_PAGE             ;SET UP ACTIVE PAGE
                CALL    IDLE_CURSOR             ;SAVE THE REAL CURSOR
                CALL    SAVE_SCREEN             ;SAVE THE REAL SCREEN
                CALL    GET_NOTEPAD             ;SHOW THE NOTEPAD
                CALL    EDIT_PAD                ;EDIT THE NOTEPAD
                CALL    SAVE_NOTEPAD            ;SAVE THE NOTEPAD
                CALL    RESTORE_SCREEN          ;RESTORE THE REAL SCREEN
                CALL    DELETE_SCRATCH          ;KILL THE SCRATCH FILE
                CALL    RESTORE_CURSOR          ;RESTORE THE REAL CURSOR

SKIP_PAD:       POP     BP
                POP     ES
                POP     DS
                POP     DI
                POP     SI
                POP     DX
                POP     CX
                POP     BX
                POP     AX                      ;RESTORE CONTEXT

                CLI
                MOV     SS,[STACK_SEGMENT]
                MOV     SP,[STACK_POINTER]      ;RESTORE OLD STACK

                POPF                            ;RESTORE ENDANGERED REGISTERS
                POP     AX
                POP     DS

                DB      0EAH                    ;AND DO A LONG JMP
VECTOR_OFFSET:  DW      0                       ;TO THE CONSOLE INPUT VECTOR
VECTOR_SEGMENT: DW      0                       ;(FILLED IN BY HOOKERS)

                DB      STACK_SIZE DUP(0)       ;LOCAL STACK BUFFER
STACK:          DW      0

MAIN            ENDP

STUFF           PROC    NEAR
;THIS ROUTINE GETS THE CONSOLE STATUS WITHOUT AN INTERUPT CALL
CONSTAT:        PUSH    ES                      ;SAVE EXTRA SEGMENT
                MOV     BX,0040H
                MOV     ES,BX                   ;MAKE ES POINT TO KEYBOARD
                CLI                             ;DISALLOW INTERUPTS
                MOV     BX,001AH
                MOV     SI,ES:[BX]              ;GET POINTER TO BUFFER HEAD
```

```
                ADD     BX,2
                MOV     DI,ES:[BX]              ;GET POINTER TO BUFFER TAIL
                MOV     AX,ES:[SI]              ;GET CHARACTER JUST IN CASE
                CMP     SI,DI                   ;SEE IF POINTERS MATCH
                STI                             ;ALLOW INTERUPTS
                POP     ES                      ;RESTORE EXTRA SEGMENT
                RET

;THIS ROUTINE GETS ONE CHARACTER FROM THE KEYBOARD
GETCH:          CALL    CONSTAT
                JZ      GETCH                   ;WAIT FOR A CHARACTER

                CLI                             ;DISALLOW INTERUPTS
                PUSH    ES
                MOV     BX,0040H
                MOV     ES,BX                   ;FAKE OUT EXTRA SEGMENT AGAIN
                MOV     BX,001AH
                MOV     SI,ES:[BX]              ;GET POINTER TO HEAD
                MOV     AX,ES:[SI]              ;GET POINTER TO BYTE
                CALL    INC_POINT               ;BUMP UP HEAD
                MOV     ES:[BX],SI              ;AND SAVE NEW POINTER
                STI                             ;RESTORE INTERUPTS
                POP     ES                      ;SAND THE SEGMENT
                RET

;THIS ROUTINE BUMPS UP THE POINTER TO THE BUFFER
INC_POINT:      INC     SI
                INC     SI                      ;POINT TO NEXT WORD IN BUFFER
                CMP     SI,003EH                ;CHECK FOR END OF QUEUE
                JNZ     INC_POINT1
                MOV     SI,001EH                ;IF IT IS, LOOP TO BEGINNING
INC_POINT1:     RET

;THIS ROUTINE DELETES THE SCRATCH FILE
DELETE_SCRATCH: MOV     AH,41H
                MOV     DX,OFFSET SCRATCH_FILE
                INT     21H                     ;NORMAL DOS 2 DELETE
                RET

;THIS ROUTINE CHECKS THE ACTIVE PAGE NUMBER
ACTIVE_PAGE:    MOV     AH,15
                INT     10H
                CMP     AL,2
                JE      ACTIVE_1
                CMP     AL,3
                JE      ACTIVE_1                ;CHECK FOR AND 80 COLUMN MODE
                CALL    ERROR                   ;IF NOT, BYE
                RET

ACTIVE_1:       MOV     AL,BH                   ;ADD AN OFFSET INTO THE
                MOV     AH,0                    ;SEGEMENT EQUAL TO 4096
                MOV     CL,12                   ;(2^12) TIMES THE PAGE NUMBER
                SHL     AX,CL
                MOV     [SCREEN_OFFSET],AX      ;SAVE OFFSET
                RET

;THIS ROUTINE RESTORES THE SCREEN FROM THE SCRATCH FILE
RESTORE_SCREEN: MOV     AH,3DH
                MOV     DX,OFFSET SCRATCH_FILE
                MOV     AL,0
                INT     21H                     ;OPEN SCRATCH FILE
                JNC     REST_SC1
                CALL    ERROR
                RET

REST_SC1:       MOV     [SCRATCH_HANDLE],AX
                CALL    RETRACE
                MOV     BX,[SCRATCH_HANDLE]
                MOV     AH,3FH
                MOV     CX,2 * (SCREEN_WIDE * SCREEN_DEEP)
                PUSH    DS
                MOV     DX,[SCREEN_OFFSET]
                MOV     DS,[SCREEN_SEGMENT]
                INT     21H                     ;READ DATA
                POP     DS
                JNC     REST_SC2
                CALL    ERROR
                RET

REST_SC2:       MOV     AH,3EH
                MOV     BX,[SCRATCH_HANDLE]
                INT     21H                     ;CLOSE SCRATCH FILE

                RET

;THIS ROUTINE SAVES THE NOTEPAD TO A FILE
SAVE_NOTEPAD:   CMP     BYTE PTR [ERR_STATUS],0
                JE      SAVE_OK
                RET                             ;IS ERROR MODE SET?

SAVE_OK:        MOV     AH,3CH
                MOV     CX,0
                MOV     DX,OFFSET NOTEPAD_FILE
                INT     21H                     ;OPEN NOTEPAD
                JNC     SAVE_NO1
                CALL    ERROR
                RET

SAVE_NO1:       MOV     [NOTEPAD_HANDLE],AX
                CALL    RETRACE
                MOV     BX,[NOTEPAD_HANDLE]
                MOV     AH,40H
                MOV     CX,2 * (SCREEN_WIDE * SCREEN_DEEP)
                PUSH    DS
                MOV     DX,[SCREEN_OFFSET]
                MOV     DS,[SCREEN_SEGMENT]
                INT     21H                     ;WRITE SCREEN BUFFER
                POP     DS
                JNC     SAVE_NO2
                CALL    ERROR
                RET

SAVE_NO2:       MOV     AH,3EH
                MOV     BX,[NOTEPAD_HANDLE]
                INT     21H                     ;CLOSE NOTEPAD FILE

                RET

;THIS ROUTINE IDLES THE REAL CURSOR
IDLE_CURSOR:    MOV     AH,15
                INT     10H
                MOV     AH,3
                INT     10H
                MOV     [REAL_CURSOR],DX        ;GET REAL CURSOR LOCATION
                MOV     DH,25
                MOV     DL,0
                MOV     AH,2
                INT     10H                     ;LOSE REAL CURSOR
                RET

;THIS ROUTINE RESTORES THE REAL CURSOR
RESTORE_CURSOR: MOV     AH,2
                MOV     DX,[REAL_CURSOR]        ;GET REAL CURSOR LOCATION
                INT     10H                     ;RESTORE POSITION OF CURSOR
                RET

;THIS ROUTINE ALLOWS THE NOTEPAD TO BE EDITED
EDIT_PAD:       CMP     BYTE PTR [ERR_STATUS],0
                JE      EDIT_OK
                RET                             ;CHECK FOR ERROR STATUS

EDIT_OK:        MOV     [CURSOR_X],0
                MOV     [CURSOR_Y],1
                CALL    PLACE_CURSOR            ;PLACE INITIAL FAKE CURSOR

EDIT_LOOP:      CALL    GETCH                   ;GET A BYTE
                CMP     AL,0                    ;IF AL IS 0, IT'S EXTENDED
                JE      EDIT_T0
                JMP     EDIT_L1

EDIT_T0:        CMP     AH,TRAP                 ;IS IT END OF EDIT?
                JNE     EDIT_T1
                CALL    KILL_CURSOR             ;KILL FAKE CURSOR
                RET                             ;AND ON TO SAVE AND RESTORE

EDIT_T1:        CMP     AH,48H
                JE      NORTH                   ;UP ARROW?
                CMP     AH,4DH
                JE      EAST                    ;RIGHT ARROW?
                CMP     AH,4BH
                JE      WEST                    ;LEFT ARROW?
                CMP     AH,50H
                JE      SOUTH                   ;DOWN ARROW?
                CMP     AH,47H
                JE      HOME                    ;HOME?
                JMP     EDIT_LOOP               ;MUST BE BAD EXTENDED OPTION

;THIS ROUTINE MOVES THE CURSOR UP ONE
NORTH:          MOV     BYTE PTR [LAST_CONTROL],AH
                CMP     [CURSOR_Y],1
                JG      NORTH_1
                JMP     EDIT_LOOP
NORTH_1:        CALL    KILL_CURSOR
                DEC     [CURSOR_Y]
                CALL    PLACE_CURSOR
                JMP     EDIT_LOOP

;THIS ROUTINE MOVES THE CURSOR DOWN ONE
SOUTH:          MOV     BYTE PTR [LAST_CONTROL],AH
                CMP     [CURSOR_Y],SCREEN_DEEP-2
                JL      SOUTH_1
                JMP     EDIT_LOOP
SOUTH_1:        CALL    KILL_CURSOR
                INC     [CURSOR_Y]
                CALL    PLACE_CURSOR
                JMP     EDIT_LOOP

;THIS ROUTINE MOVES THE CURSOR RIGHT ONE
EAST:           MOV     BYTE PTR [LAST_CONTROL],AH
                CMP     [CURSOR_X],SCREEN_WIDE
                JL      EAST_1
                JMP     EDIT_LOOP
EAST_1:         CALL    KILL_CURSOR
                INC     [CURSOR_X]
                CALL    PLACE_CURSOR
                JMP     EDIT_LOOP

;THIS ROUTINE MOVES THE CURSOR LEFT ONE
WEST:           MOV     BYTE PTR [LAST_CONTROL],AH
                CMP     [CURSOR_X],0
                JG      WEST_1
                JMP     EDIT_LOOP
WEST_1:         CALL    KILL_CURSOR
                DEC     [CURSOR_X]
                CALL    PLACE_CURSOR
                JMP     EDIT_LOOP

;THIS ROUTINE HANDLES HOME AND CLEAR
HOME:           CMP     BYTE PTR [LAST_CONTROL],47H     ;IF TWO HOMES IN
                JNE     HOME_1                          ;A ROW, CLEAR TUBE
                CALL    INIT_NOTEPAD
HOME_1:         CALL    KILL_CURSOR             ;MOVE CURSOR
                MOV     [CURSOR_X],0            ;TO UPPER
                MOV     [CURSOR_Y],1            ;LEFT HAND CORNER
                CALL    PLACE_CURSOR
                MOV     [LAST_CONTROL],47H
                JMP     EDIT_LOOP

;THIS ROUTINE HANDLES NO-EXTENDED CHARACTERS IN EDIT
EDIT_L1:        MOV     BYTE PTR [LAST_CONTROL],0       ;ZERO HOME FLAG

                CMP     AL,8                    ;CHECK FOR BACKSPACE
                JNE     EDIT_L2
                CMP     [CURSOR_X],0            ;IS THERE ROOM ON THE LINE?
```

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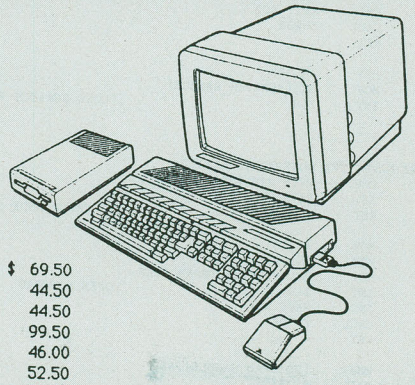

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```
                JG      EDIT_BACK1
                JMP     EDIT_LOOP
EDIT_BACK1:     CALL    KILL_CURSOR
                DEC     [CURSOR_X]
                MOV     AL,' '
                CALL    PRINT
                DEC     [CURSOR_X]
                CALL    PLACE_CURSOR
                JMP     EDIT_LOOP

EDIT_L2:        CMP     AL,13           ;CHECK FOR CARRIAGE RETURN
                JNE     EDIT_L3
                CALL    KILL_CURSOR
                MOV     [CURSOR_X],0
                INC     [CURSOR_Y]
                CMP     [CURSOR_Y],SCREEN_DEEP-2
                JLE     EDIT_RET1
                MOV     [CURSOR_Y],SCREEN_DEEP-2
EDIT_RET1:      CALL    PLACE_CURSOR
                JMP     EDIT_LOOP

EDIT_L3:        CMP     AL,31           ;CHECK FOR PRINTABLE CHARACTER
                JG      EDIT_PRINT
                JMP     EDIT_LOOP
EDIT_PRINT:     CALL    KILL_CURSOR
                CALL    PRINT
                CALL    PLACE_CURSOR
                JMP     EDIT_LOOP

;THIS ROUTINE PRINTS THE CHARACTER IN AL AT CURRENT CURSOR
PRINT:          PUSH    BX
                PUSH    ES
                PUSH    AX
                CALL    POSITION        ;GET MEMEORY POINTER TO SCREEN
                MOV     ES,[SCREEN_SEGMENT]
                ADD     BX,[SCREEN_OFFSET]
                CALL    RETRACE         ;WAIT FOR RETRACE
                POP     AX              ;GET CHARACTER FROM STACK
                MOV     ES:[BX],AL      ;SAVE IT TO SCREEN
                POP     ES
                INC     [CURSOR_X]      ;UPDATE CURSOR POSITION BUFFERS
                CMP     [CURSOR_X],SCREEN_WIDE
                JL      PRINT_1
                MOV     [CURSOR_X],0
                INC     [CURSOR_Y]
                CMP     [CURSOR_Y],SCREEN_DEEP-2
                JLE     PRINT_1
                MOV     [CURSOR_Y],SCREEN_DEEP-2
PRINT_1:        POP     BX
                RET

;THIS ROUTINE KILLS THE CURSOR
KILL_CURSOR:    PUSH    ES
                PUSH    AX
                CALL    POSITION        ;GET MEMORY POINTER
                MOV     ES,[SCREEN_SEGMENT]
                ADD     BX,[SCREEN_OFFSET]
                CALL    RETRACE         ;WAIT FOR RETRACE
                MOV     AL,BYTE PTR [SCREEN_ATTR]
                MOV     ES:[BX+1],AL    ;MAKE ATTRIBUTE NORMAL
                POP     AX
                POP     ES
                RET

;THIS ROUTINE ACTIVATES THE CURSOR
PLACE_CURSOR:   PUSH    ES
                PUSH    AX
                CALL    POSITION        ;GET MEMORY POINTER
                MOV     ES,[SCREEN_SEGMENT]
                ADD     BX,[SCREEN_OFFSET]
                CALL    RETRACE         ;WAIT FOR RETRACE
                MOV     AL,BYTE PTR [SCREEN_ATTR]
                MOV     CL,4
                ROL     AL,CL           ;MAKE ATTRIBUTE INVERSE
                MOV     ES:[BX+1],AL
                POP     AX
                POP     ES
                RET

;THIS ROUTINE WAITS FOR THE RETRACE SO THERE'S NO SNOW
RETRACE:        PUSH    DX
                PUSH    AX
                MOV     DX,[CARD_BASE]
                ADD     DX,6
RETRACE_1:      IN      AL,DX
                TEST    AL,1
                JNZ     RETRACE_1
                POP     AX
                POP     DX
                RET

;THIS ROUTINE FINDS THE MEMORY LOCATION POINTED TO BY THE CURSOR IN BX
POSITION:       MOV     AX,[CURSOR_Y]           ;GET NUMBER OF LINES
                MOV     AH,0
                MOV     BL,(SCREEN_WIDE*2)
                MUL     BL                      ;TIMES 80 WORDS
                MOV     BX,[CURSOR_X]           ;GET NUMBER OF
                MOV     BH,0
                SHL     BX,1                    ;WORDS IN X DIMENSION
                ADD     BX,AX                   ;ADD TO POINTER
                RET

;THIS ROUTINE GETS THE NOTEPAD TO THE SCREEN
GET_NOTEPAD:    CMP     BYTE PTR [ERR_STATUS],0
                JE      GETNP_OK                ;CHECK FOR ERRORS
                RET

GETNP_OK:       MOV     AH,3DH
                MOV     AL,2
                MOV     DX,OFFSET NOTEPAD_FILE
                INT     21H                     ;OPEN NOTEPAD
                JNC     GET_NO1
                CALL    INIT_NOTEPAD
                JMP     GET_NO2

GET_NO1:        MOV     [NOTEPAD_HANDLE],AX
                CALL    RETRACE
                MOV     BX,[NOTEPAD_HANDLE]
                MOV     AH,3FH
                MOV     CX,2 * (SCREEN_WIDE * SCREEN_DEEP)
                PUSH    DS
                MOV     DX,[SCREEN_OFFSET]
                MOV     DS,[SCREEN_SEGMENT]
                INT     21H                     ;READ NOTEPAD INTO SCREEN
                POP     DS
                JNC     GET_NO2
                CALL    INIT_NOTEPAD

GET_NO2:        MOV     AH,3EH
                MOV     BX,[NOTEPAD_HANDLE]
                INT     21H                     ;CLOSE NOTEPAD FILE

                RET

;THIS ROUTINE INITIALIZES THE NOTEPAD PAGE
INIT_NOTEPAD:   PUSH    ES
                CALL    RETRACE                 ;WAIT FOR RETRACE
                MOV     AL,' '
                MOV     AH,BYTE PTR [SCREEN_ATTR]
                CLD
                MOV     ES,[SCREEN_SEGMENT]
                MOV     CX,(SCREEN_WIDE * SCREEN_DEEP)
                MOV     DI,[SCREEN_OFFSET]
REPNE           STOSW                           ;FILL SCREEN WITH BLANKS

                MOV     [CURSOR_X],0
                MOV     [CURSOR_Y],0
                MOV     BX,OFFSET TOP_LINE
                CALL    PRT_NULL                ;PRINT TOP LINE

                MOV     [CURSOR_X],0
                MOV     [CURSOR_Y],SCREEN_DEEP-1
                MOV     BX,OFFSET BOTTOM_LINE
                CALL    PRT_NULL                ;PRINT BOTTOM LINE

                POP     ES
                RET

;THIS ROUTINE SAVES THE SCREEN TO A SCRATCH FILE
SAVE_SCREEN:    CMP     BYTE PTR [ERR_STATUS],0
                JE      SAVES_OK
                RET                             ;CHECK FOR ERRORS

SAVES_OK:       MOV     AH,3CH
                MOV     DX,OFFSET SCRATCH_FILE
                MOV     CX,0
                INT     21H                     ;CREATE SCRATCH FILE
                JNC     SAVE_SC1
                CALL    ERROR
                RET

SAVE_SC1:       MOV     [SCRATCH_HANDLE],AX
                CALL    RETRACE                 ;WAIT FOR RETRACE
                MOV     BX,[SCRATCH_HANDLE]
                MOV     AH,40H
                MOV     CX,2 * (SCREEN_WIDE * SCREEN_DEEP)
                PUSH    DS
                MOV     DX,[SCREEN_OFFSET]
                MOV     DS,[SCREEN_SEGMENT]
                INT     21H                     ;WRITE SCREEN TO FILE
                POP     DS
                JNC     SAVE_SC2
                CALL    ERROR
                RET

SAVE_SC2:       MOV     AH,3EH
                MOV     BX,[SCRATCH_HANDLE]
                INT     21H                     ;CLOSE SCRATCH FILE

                RET

;THIS ROUTINE SIGNALS AN ERROR BY BEEPING THE SQUEAKER-SPEAKER
ERROR:          MOV     BL,1
                MOV     AL,0B6H
                OUT     43H,AL
                MOV     AX,533H
                OUT     42H,AL
                MOV     AL,AH
                OUT     42H,AL
                IN      AL,61H
                MOV     AH,AL
                OR      AL,03
                OUT     61H,AL
                SUB     CX,CX
ERR_1:          LOOP    ERR_1
                DEC     BL
                JNZ     ERR_1
                MOV     AL,AH
                OUT     61H,AL

                MOV     BYTE PTR [ERR_STATUS],-1

                RET                             ;BBEP SPEAKER

;THIS ROUTINE PRINTS THE STRING IN BX UNTIL A NULL
PRT_NULL:       MOV     AL,[BX]
                CMP     AL,0
                JNE     PRT_NULL1
                RET
PRT_NULL1:      CALL    PRINT
                INC     BX
                JMP     PRT_NULL
```

```
;--- BUFFERS AND THINGS

STACK_POINTER:  DW      0                       ;STACK STUFF
STACK_SEGMENT:  DW      0
SCRATCH_FILE:   DB      'NOTEPAD.$$$',0         ;FILE NAME FOR SCRATCH
SCRATCH_HANDLE: DW      0                       ;FILE HANDLE FOR SCRATCH
NOTEPAD_FILE:   DB      'NOTEPAD',0             ;NAME FOR NOTEPAD FILE
NOTEPAD_HANDLE: DW      0                       ;HANDLE FOR NOTEPAD
SCREEN_SEGMENT: DW      0B800H                  ;SEGEMENT WHERE SCREEN RESIDES
SCREEN_OFFSET:  DW      0                       ;OFFSET INTO SEGMENT
SCREEN_ATTR:    DB      2                       ;ATTRIBUTE OF SCREEN
CURSOR_X:       DW      0                       ;CURSOR X POSITION
CURSOR_Y:       DW      0                       ;CURSOR Y POSITION
CARD_BASE:      DW      03D4H                   ;BASE OF COLOUR CARD'S 6845
LAST_CONTROL:   DB      0                       ;LAST EXTENDED CONTROL CODE
REAL_CURSOR:    DW      0                       ;PLACE TO SAVE REAL CURSOR
ERR_STATUS:     DB      0                       ;ERROR STATUS 0=OK

TOP_LINE:       DB      28 DUP (0C4H)
                DB      '[ on line notepad '
                DB      VERSION+'0','.',SUBVERSION+'0',' ]'
                DB      28 DUP (0C4H)
                DB      0

BOTTOM_LINE:    DB      22 DUP (0C4H)
                DB      '[ copyright (c) 1986 steve rimmer ]'
                DB      22 DUP (0C4H)
                DB      0


END_HANDLERS:   DB      0

;THIS CODE HOOKS IN THE INTERUPT VECTORS
INSTALL_HOOKS:  CLI                             ;DISALLOW INTERUPTS
                PUSH    ES
                MOV     AH,35H
                MOV     AL,TRAP_NUMBER
                INT     21H                     ;GET EXISTING VECTOR
                MOV     [VECTOR_OFFSET],BX      ;SAVE VECTOR IN CODE
                MOV     [VECTOR_SEGMENT],ES
                POP     ES

                PUSH    DS
                MOV     AH,25H
                MOV     AL,TRAP_NUMBER
                PUSH    CS
                POP     DS
                MOV     DX,OFFSET PAD_HANDLER
                INT     21H                     ;INSTALL HOOK INTO
                POP     DS                      ;LOW MEMORY VECTOR TABLE
                STI

                MOV     AH,9
                MOV     DX,OFFSET MESSAGE
                INT     21H                     ;SAY "HOWZIT GOIN'"

                MOV     DX,OFFSET END_HANDLERS  ;POINT TO OUR PROTECTED CODE
                INT     27H                     ;TERMINATE BUT STAY RESIDENT

MESSAGE:        DB      'Resident Notepad version '
                DB      VERSION+'0','.',SUBVERSION+'0',' ready to rip.'
                DB      13,10,'Copyright (c) 1986 Steve Rimmer'
                DB      13,10,'Hit control end to activate the pad'
                DB      13,10,'Be cool...$'

STUFF           ENDP
CODEX           ENDS

                END     START
```

The ideal way to save the screen would be to copy it into memory... but this isn't eminently practical considering that the note pad can't really know how the memory of the system is likely to be allocated. Having it permanently tie up four K for itself is a bit of a waste. As such, the next best thing is to save the screen contents to a scratch file on the disk.

The type 21H interrupt provides calls in DOS two and beyond which will write a chunk of memory to the disk and read it back again with one call each. Check out the *Handle on DOS* article in the January 1986 edition of Computing Now! for more about these things. With these calls, moving stuff in and out of the screen memory is fairly uninvolved. Because I've used these calls in this program, this thing must run under DOS two or better.

The screen memory lives up in segment 0B800H of the PC if you're using a colour card. The first page of it is at an offset of zero in this segment. As such, we can locate the buffer that the disk files will move in and out of fairly easily by pointing it at the active screen. We have to fudge this a bit by finding out what the active page is... there are four of them... and adding an offset to the base of the segment if the system happens to be in a different page.

The only drawback to handling the screen this way is that it does generate some snow when the files move in and out of the screen memory buffer. There isn't a great deal one can do about this... the PC's screen controller resents having things casually poked into its buffer. We more or less eliminate the problem for smaller amounts of data by waiting for the screen retrace before writing to it, as we'll see in a moment.

The first time you run note pad, it will save the screen and look for its note pad file on the disk. If one isn't there, it will create a blank screen with nothing but top and bottom markers. The next time it looks for the file it should find it, and you'll see the markers plus anything you've typed between them.

By the way, the paths to the two note pad files are simply file names here... you can point them into subdirectories if you want to, and you probably should make them point to specific drives so that you don't wind up with several sets of note pads if you change disks.

The screen editor is the most involved part of the program. It has a fairly limited number of commands... you can add some more if you want to. All of the printable characters will, not surprisingly, print on the screen. You can type onto it normally. The arrow keys move the cursor. Hitting the home key will home the cursor... hit it twice in a row and it will blank the note pad and give you a clean page. Be careful of this... if you do it inadvertently you'll lose all your notes.

The backspace key back spaces normally, and the carriage return behaves as it usually would. There is no life in the insert and delete keys. The control end combination will exit the editor.

The characters on the editor's screen are not printed there, but, rather, stuffed directly into the screen memory. Likewise, the cursor isn't the usual DOS cursor, which is suppressed while we're in the edit mode. The edit cursor is created by rotating the attribute byte for the character we wish to appear under the cursor left by four places, that is, by switching the background and foreground colours. The cursor will, thus, invert whatever character it's over. There was not really any good reason for doing it this way... it was just an interesting bit of code.

One potential problem in this part of the program is the requirement for it to get keyboard characters. It's not hard to have the program repeatedly calling itself if we do this by having it use type 16H interrupts. As such, all the internal keyboard stuff is handled through code which looks directly at the keyboard queue and pointers. This is highly uncool, and not the decent way to do things. The trolls of IBM would frown on it. More to the point, if you have a slightly peculiar compatible system it might not work properly. You may have to change a few things in GETCH and CONSTAT.

When you exit the edit mode the process of moving screens and disk files around happens in reverse. The note pad screen is saved back into its file... called NOTEPAD here... and the screen that it replaced is put back, calling it out of the scratch file, NOTEPAD.$$$. As the scratch file is no longer needed... we'll just create it again the next time the pad is called for... this file is deleted by the program and, as such, you'll normally never see it.

The use of these disk files does require that there be some blank space on the disk that's to hold them. You'll need at least eight kilobytes of free space for the pad program to work properly. While it won't hang or do anything disasterous if it runs out of room, it may trash the screen of your application temporarily, depending on exactly where in the process it encounters a full disk.

Grace Notes

The note pad is a handy thing to have living in the background of your system. It occupies almost no RAM and won't present interaction problems with most reasonably designed software. The pad itself will stay dormant for as long as you want to ignore it, but it will turn up almost instantly when you summon it.

This is, of course, a fairly simple example of a resident keyboard sampling program... there are other things one can do with this sort of code. Consider the advantages of video games which can be called up and put away from within spread sheets or other silicon mundanities. Such a thing might almost make Lotus tolerable. **CN!**

PC News Letter Generator

This simple BASIC program will take unexciting text files and turn them into electrifying columnar type, all set to impress the higher ups of your choice.

by S.R. Ferrybridge

There was a time when we managed to get along without paper. We did in a lot of trees to produce magazines, of course, but there's something in publishing that sort of necessitates that. However, interoffice waste paper... memos and such... were almost unheard of.

Things have changed, and, like most larger companies we publish quite a lot of things that never leave our own space. Initially these were hand written and photocopied. Later on someone discovered typewriters and, more recently still, word processing. This latter revelation may have been a giant step backwards, as the volume of internal correspondence seemed to about triple with the advent of computers in all the offices. My *in* basket is nailed to the wall immediately above my waste paper basket, and the former artifice has recently had its bottom sawed out.

Most companies eventually get into publishing internal newsletters, whether to communicate among a collection of desks or with a network of branch offices. Unless one happens to be running IBM or General Motors, one's newsletters probably don't look much better than one's memos. Word processors aren't usually up for the easy production of reasonable looking pages.

This program is a news letter generator in BASIC. It will in-

PC News Letter Generator

hale a standard WordStar file and produce columnar type that looks very much like that which is rendered by a typesetter. It will generate complete pages which have all their columns in the right places. It makes reports look pretty slick, and even helps in printing out basic text files, as it gets a lot more text on a page in a much more useful and readable format.

One from Column A

In fact, this program can be easily used with almost any sort of printer. I've set it up here to do three columns across a page using an Epson FX80 in its compressed mode, allowing for up to a hundred and sixty characters on a line. You may want to use it with a daisy wheel, in which case you should change the values of the configuration variables... the PAGE and TAB values... at the top of the code. The string PRINTER.INIT should be changed to pop your printer into whatever mode you plan on using it with.

The process of taking a bunch of characters and fitting them into a predefined format of columns is called "pouring" type, another one of those splendid anachronisms that date back to the birth of mechanical typesetting. In this case, the analogy is fairly close.

A WordStar document file is a peculiar creation. WordStar takes text entered into it from a keyboard and sets some of the high bits on the characters to indicate where the ends of lines and things are. It also adds some spaces to lines which require pad-

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1112052000
PC News Letter Generator

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110009
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5120110ne From Column A110009
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it can acheive right margin
justification. In order to differentiate
these spaces... soft spaces... from
those that human beings gave it to put
on the screen it sets their high bits
too.
     Setting the high bit of a character
has the same effect as adding a hundred
and twenty eight to its ASCII value...
assuming that it's less than a hundred
and twenty eight to start with.
     If one were into inhale all the
characters in a WordStar file and ignore
those which had the value &H8D... that's
a soft carraige return... and &HA0... a
soft space, setting any other high bits
to zero, one would have a file which had
one very long line for each paragraph.
That's pretty well what we want in order
to be able to reformat the text into
columns of our own choosing.
     This program formats the text it
works with in a way not unlike that of a
word processor. Starting with a blank
line, it takes one character at a time
and adds it to the line until the end of
the line is reached. Chances are this
will occure in the middle of a word, so
it will now back up until it's looking
at a space, storing the discarded
characters somewhere so that they can be
used at the beginning of the next line.
     More sophisticated word
processors... and typesetters... handle
the ends of lines a bit more complexly,
as they will want to hyphenate words if
they can. Hyphenation is a fairly
involved process, and far beyond the
scope of this simple program. This thing
produces slightly looser type than one
would get if one had hypenation
facilities, but a workable hyphenation
program would probably be about ten
times the size of this simple code.
     The process of generating a page of
text with this program can be seen as
having two stages. The first part pours
the text into the array GALLEY$(), where
each element in the array is a string
GALLEY.WIDE long... padded out with
spaces if needs be. The second part
creates pages by assembling lines
selected from the GALLEY$() array.
     In printing a page of three columns
which is, say, fifty five lines deep, we
wish the first line to consist of the
first, fifty sixth and hundred and
twelfth elements in the GALLEY$() array.
That is, we want to print the top of
each of three columns. One might think
of having three pointers into the array,
each one moving down it by one for each
line on the page.
     This program can send its final
text to either a disk file or the
printer. It's fairly slow, so if you
want to print multiple copies you'll
probably do well to chose the disk file
option and then use the MS-DOS PRINT
command to print the files. It creates
files called PAGE-1, PAGE-2, PAGE-3 and
so on.

5120110ll The News110009
Purists will insist that any decent word
processor with columnary block
manipulation facilities will produce
virtually the same things that this
program will do, and they'd be right...
```

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Setting the high bit of a character has the same effect as adding a hundred and twenty-eight to its ASCII value... assuming that it's less than a hundred and twenty-eight to start with.

If one were to inhale all the characters in a WordStar file and ignore those which had the value &H8D... that's a soft carriage return... and &HA0... a soft space, setting any other high bits to zero, one would have a file which had one very long line for each paragraph. That's pretty well what we want in order to be able to reformat the text into columns of our own choosing.

This program formats the text it works with in a way not unlike that of a word processor. Starting with a blank line, it takes one character at a time and adds it to the line until the end of the line is reached. Chances are this will occur in the middle of a word, so it will now back up until it's looking at a space, storing the discarded characters somewhere so that they can be used at the beginning of the next line.

More sophisticated word processors... and typesetters... handle the ends of lines a bit more complexly, as they will want to hyphenate words if they can. Hyphenation is a fairly involved process, and far beyond the scope of this simple program. This thing produces slightly looser type than one would get if one had hypenation facilities, but a workable hyphenation program would probably be about ten times the size of this simple code.

The process of generating a page of text with this program can be seen as having two stages. The first part pours the text into the array GALLEY$( ), where each element in the array is a string GALLEY.WIDE long... padded out with spaces if needs be. The second part creates pages by assembling lines selected from the GALLEY$( ) array.

In printing a page of three columns which is, say, fifty-five lines deep, we wish the first line to consist of the first, fifty-sixth and hundred and twelfth elements in the GALLEY$( )array. That is, we want to print the top of each of three columns. One might think of having three pointers into the array, each one moving down it by one for each line on the page.

This program can send its final text to either a disk file or the printer. It's fairly slow, so if you want to print multiple copies you'll probably do well to chose the disk file option and then use the MS-DOS PRINT command to print the files. It creates files called PAGE-1, PAGE-2, PAGE-3 and so on.

All the News

Purists will insist that any decent word processor with columnary block manipulation facilities will produce virtually the same things that this program will do, and they'd be right... sort of. However, column manipulations under a word processor are usually a bit hard to work with, and the resulting documents are a dog to edit. This bit of code keeps all the nasty bits to itself.

You might want to modify this thing to your own ends. You could, for example, have it print a banner or a masthead at the top of the first page, draw a line at the bottoms of pages or even work in some bit mapped graphics, depending on the capabilities of your printer and how elaborate you want to get.

```
10 '     newletter and random columnar foolishness generator     '
20 '     copyright (c) 1985,86 steve rimmer                      '
30 '                                                             '
40 '     the nearest thing to a pc typesetter without filling    '
50 '     your disk drives with hot lead                          '
60 '
70 DEFINT A-Z
80 FALSE=0 : TRUE = NOT FALSE
90 ESC$=CHR$(27)
100 LOW.ALPHA$="abcdefghijklmnopqrstuvwxyz"
110 UP.ALPHA$="ABCDEFGHIJKLMNOPQRSTUVWXYZ"
120 NUMBER$="0123456789"
130 MENU.LINE=23
140 PAGE.WIDE=156          'number of characters to a line
150 PAGE.COLUMNS=3         'number of columns to a page
160 PAGE.GUTTERS=4         'numbers of characters to a gutter
170 PAGE.DEEP=55           'number of lines to a page
180 DIM GALLEY$(255)
190 TAB.WIDE=5             'padding for tabs
200 PRINTER.INIT$=ESC$+CHR$(15)
210 GOSUB 920
220 SCREEN 0 : WIDTH 80 : LOCATE ,,1 : CLS : END
230 'DO LINE INPUT
240 LOCATE ,,1
250 C$ = "" : B$ = ""
260 WHILE B$ <> CHR$(13)
270 B$=INPUT$(1) : IF INSTR(M$ + CHR$(8) + CHR$(13), B$) = 0
        THEN 270
280 IF B$=CHR$(8) AND LEN(C$)<1 THEN 270
290 IF B$=CHR$(8) THEN PRINT CHR$(29) " " CHR$(29);
        : C$=LEFT$(C$,LEN(C$)-1) : GOTO 270
300 IF B$ <> CHR$(13) AND LEN(C$)<ENT THEN C$=C$ + B$ : PRINT B$;
310 WEND
320 IF RIGHT$(C$,1)=CHR$(13) THEN C$=LEFT$(C$,LEN(C$)-1)
330 LOCATE ,,0
340 RETURN
350 'show a menu
360 LOCATE MENU.LINE,1,0 : PRINT SPACE$(80);
370 LOCATE MENU.LINE,1,0 : PRINT A$;
380 RETURN
390 'inhale type and pour it
400 GALLEY.DEEP=PAGE.COLUMNS*PAGE.DEEP
410 PAGE.NUMBER=PAGE.NUMBER+1 : PAGE.NAME$=RIGHT$(STR$(PAGE.NUMBER),
        LEN(STR$(PAGE.NUMBER))-1)
420 A$="assembling page "+PAGE.NAME$ : GOSUB 350
430 FOR X=1 TO GALLEY.DEEP
440 GOSUB 640 'inhale one line of text
450 GALLEY$(X)=T$ : IF NOT FILE.FLAG THEN X=GALLEY.DEEP
460 LOCATE 1,1,0 : PRINT "line " X "     "
        : LOCATE 1,20,0 : PRINT FILE.LENGTH " bytes remaining."
470 LOCATE 3,1,0 : IF X<10 THEN Y=1 ELSE Y=X-10
480 FOR Z=Y TN X : PRINT GALLEY$(Z) "|" SPACE$(5) : NEXT Z
490 NEXT X
500 IF NOT PRINTER.FLAG THEN OPEN "O",#2,
        "PAGE-"+PAGE.NAME$ ELSE OPEN "LPT1:" AS 2
510 PRINT #2,PRINTER.INIT$;
520 FOR X=1 TO PAGE.DEEP
530 FOR Y=1 TO PAGE.COLUMNS
540 PRINT #2,GALLEY$(X+(PAGE.DEEP*(Y-1)));
550 IF Y<PAGE.COLUMNS THEN PRINT #2,SPACE$(PAGE.GUTTERS);
560 NEXT Y
570 PRINT #2,CHR$(13) CHR$(10);
580 NEXT X
590 PRINT #2,CHR$(13)CHR$(10)CHR$(13)CHR$(10)SPACE$((PAGE.WIDE-10)/2)
        "- Page "PAGE.NAME$" -"
600 IF PRINTER.FLAG THEN PRINT #2,CHR$(12);
610 CLOSE #2
620 IF FILE.FLAG THEN 410
630 RETURN
640 'inhale one line of text
650 GALLEY.WIDE=(PAGE.WIDE/PAGE.COLUMNS)-(PAGE.COLUMNS*PAGE.GUTTERS)
660 B=0 : L=0 : T$=H$
670 WHILE (B<>&HD) AND (B<>&H8D) AND (L<=GALLEY.WIDE) AND FILE.FLAG
680 B$=INPUT$(1,1) : B=ASC(B$) : FILE.LENGTH = FILE.LENGTH - 1
        : IF FILE.LENGTH > 0 THEN FILE.FLAG = TRUE
690 GOSUB 810
700 T$=T$+B$
710 L=LEN(T$) : IF B$<>"" THEN P=ASC(B$)
720 WEND
730 B$="" : H$=""
740 WHILE B$<>" " AND L>0
750 B$=MID$(T$,L,1)
760 IF B$<>" " THEN H$=B$+H$ : MID$(T$,L,1)=" " : L=L-1
770 WEND
780 IF H$ = " " THEN H$=""
790 IF LEFT$(T$,1)="." THEN 650 'ignore wordstar dot commands
800 RETURN
810 'handle translation -- returns b$ for b
820 IF (L=0) AND (B=32) THEN B$=""
830 IF B=&HA0 THEN B$=""
840 IF (B=&H8D) AND (P<>32) THEN B$=" " : B=0
850 IF (B=&H8D) AND (P=32) THEN B$="" : B=0
860 IF B>127 THEN B=B-128
870 IF B<32 THEN B$=""
880 IF B=9 THEN B$=SPACE$(TAB.WIDE)
890 IF B=13 THEN B$=SPACE$(1+(GALLEY.WIDE-L))
900 IF B>=32 THEN B$=CHR$(B)
910 RETURN
920 'main code
930 FILE.FLAG=TRUE
940 WIDTH "LPT1:",175
950 CLS : KEY OFF
960 A$="output <p>rinter or <d>isk: " : GOSUB 350
970 M$="PDpd" : ENT=1 : GOSUB 230
980 IF LEN(C$)<1 THEN RETURN
990 IF C$="P" OR C$="p" THEN PRINTER.FLAG=TRUE ELSE PRINTER.FLAG=FALSE
1000 A$="source file: " : GOSUB 350
1010 M$=UP.ALPHA$+LOW.ALPHA$+NUMBER$+" \:" : ENT=32 : GOSUB 230
1020 OPEN "I",#1,C$
1030 FILE.LENGTH=LOF(1)
1040 GOSUB 390          'inhale type
1050 RETURN
```

CN!

The Tandy DC-2212 Modem Review

Often times a font of peculiar computer hardware, Radio Shack has spewed forth a fairly capable twelve hundred baud intelligent modem.

by Jim Omura

My vote for the most eccentric computer company on the planet would probably go to Tandy, a company which blissfully ignores much of the industry's common knowledge and still survives. In fact, as of now, it's doing quite well. Its array of products and the corporate strategy they represent are baffling. On the one hand, they make some of the technologically and commercially smartest moves in the industry, and on the other hand, one can point to signs of incredible ignorance of the same.

With that in mind, one should never take *any* Tandy introduction at face value. Even if the specification superficially looks fairly ordinary, such as those of the Tandy 1000, their actual hardware can take you by surprise. In this case, the DC-2212 intelligent modem, catalogue number 26-1176, is an adventure beyond the mere scarfing of a cheap Hayes compatible. At least it gives you some reason to read the manual.

The DC-2212 is now the top of the line modem sold in the Shack stores. It can be seen as the replacement for the old Modem II, a three hundred baud version, as Tandy's top of the line, as a competitor for other smart modems generally, or as a potential conversation piece for your living room.

The Modem II was an early attempt at technological elitism. It had many characteristics which lead to this role. It spoke only three hundred baud, which was reasonable at the time of it's birth, since twelve hundred baud was both rare and at times unreliable. It had auto-dial and auto-answer, which made it specification wise, a competitor to the cadillac of home hackers, the Hayes SmartModem. It could even be told to hang up and not answer, if you were in a vile mood. To reinforce the elitist atmosphere it demanded that you gave it instructions as it alone saw fit, in upper case, with eight databits and no parity. Furthermore, to prove your worthiness, such instructions had to be made without errors, the commission of which was punished by making you start over from scratch. All in all, it was truly a modem that separated the rank beginner from the elite hacker.

Taming the Modem II was usually accomplished by using smart terminal programs which stored dialing and login sequences. The Modem II thus provided one with a truly unique conversation piece with far greater potential than a Grecian urn. In fact, a sly hint of its purpose in life was evident upon reading the manual. It was wonderfully opaque. Many a time there was, when an upwardly mobile novice having attempted deciphering it's sacred code would beg audience with an elite hacker to find out how to make his or her esteemed artifact do even the simplest chore. If one wanted to purge one's household of unwanted guests there was no better way than to read them passages from this immortal tome.

The DC-2212 bridges the gulf between this original elitest monument and the populist world of the modern computerist. On the one hand, the original usages of the

Modem II are generally retained, with the sole difference of the wakeup command consisting of an asterisk followed by a period instead of the old version, in which the second asterisk was not usually necessary, but could be sent for assurance. The new wakeup call is used in order to allow the 2212 to identify what language you will be speaking. The possibilities include eight bit, seven bit, any parity, and baud rates from seventy-five to twelve hundred.

This new trend to being fogiving to the ineptitude of the lowly user is manifested in other aspects of the new breed heir. No longer the demanding curmugeon, the DC-2212 will accept its instructions in lower case or upper case at the whim of the user. In fact, it will accept the normal backspace and actually allow the deletion of errors for the clumsy.

Table One

The DC-2212 supports the following RS-232 signals.

2.	Transmit data
3.	Receive data
5.	Clear to send
6.	Data set ready
7.	Ground
8.	Carrier detect
12.	High speed/low speed
15.	Transit timing
17.	Receiver timing
20.	Data terminal ready
22.	Ring detect
24.	External transmitter timing

The receiver Sensitivity is 0 to -45dBm. High speed + 1%, -2.5% modes, low speed binary, serial, asynchronous high speed character asynchronous or bit synchronous format.

Only two switches of the original five remain on the DC-2212. The back of the modem sports a sliding switch to enable or disable auto-answer. The other switch, on the front left is the ubiquitous power on/off switch. If you need advice on the function of these, you probably can't use a computer anyway. The rest of the switches of the Modem II are replaced by a set of software commands.

Being a communication device, the DC-2212 has, appropriately, a multitude of ways to communicate with the user. Six panel lights grace the faceplate of the modem signalling high speed, off hook, terminal ready, carrier detect, transmit data and receive data. To make life even simpler a selection of reports and prompts can be made to fill your screen, or at least the first twenty odd columns. To see what occupies the little troll's memory you can enter *L* for a list. If set to redial, the modem will report dial attempts. Dead lines are reported and so on. In fact, the DC-2212 will keep you company in those cases that you fail to reach your destination with a barrage of comments such as

```
DIALING t8684100
RINGING...
RINGING...
ON LINE ORG
```

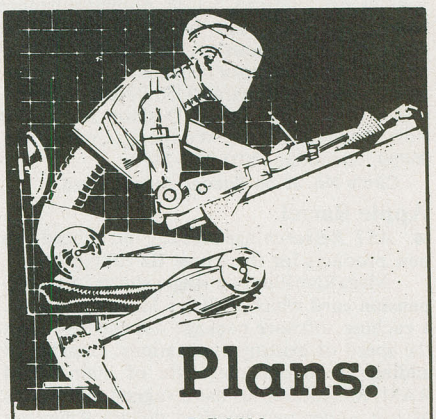
Speaking to the DC-2212, on the other hand, has been enhanced by many extensions to the Modem II's vocabulary. Among the extensions are

@ Refresh Abort
A,a Auto Answer
C,c Clear all user options
E,e Echo disable/enable
G,g Forced carrier detect
I,i Advanced programming enable
M,m Manual/auto toggle
Q,q Analog selftest loop

The shape of the DC-2212 is the same as that of the Modem II, meaning it's not the right shape to sit an old style standard telephone on. If you tried to do this, you'd just cover up the status lights and power switch.

I used the DC-2212 constantly for about a month and found that there were few times when I had errors at either three or twelve hundred baud. This is quite encouraging. In the Toronto area the lines are generally good, but there is one line I've used on one system that has always been noisy. There was no indication that the DC-2212 was more susceptible to line noise than my Modem II.

Another improvement over the original Modem II is the power up time. The Modem II required a couple of seconds to run its power up program before it was capable of doing anything. The DC-2212, by way of contrast, is almost instantaneous.



Plans:

Modem:	**DC-2212**
Manufacturer:	**Tandy**
Baud Rate:	**300/1200**
Availability:	**Radio Shack Computer Stores**
Price:	**$599.00**

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continued from page 7

COMPUTER PRESS

Translations

From *Desktop A.I.* comes dBx Translator, a programmer's tool which allows moving **dBASE programs into the C language**. Such a conversion allows dBASE applications to be used in multiuser and network situations, as well as on machines which normally cannot handle dBASE, such as Macintoshes and Amigas, and machines running under UNIX or XENIX. Package price depends on system configuration, and starts at $350.00 US. For further information, contact Desktop A.I., 1720 Post Road East, #3, Westport, Connecticut 06880, telephone (203) 255-3400.

Circle No. 38 on Reader Service Card.

Apple Barrel

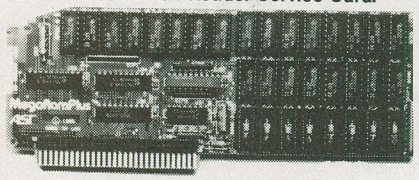
● *AST Research* has recently introduced two new products for the Apple IIe computers.

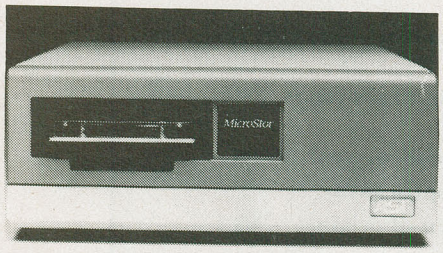
MegaRamPlus is a **single slot memory expansion card** which includes MegaRamCache, a caching software package designed to boost the speed of existing applications. Capable of adding up to one megabyte of main board RAM, MegaRamPlus has a suggested list price of just under two hundred dollars American for the minimum 64K configuration.

A twenty megabyte **hard disk/tape backup** subsystem has been added to the MicroStor line. Using 3.5 inch Winchester and tape drives the 20 MicroStor is fully compatible with software written for ProDOS, DOS 3.3, Apple II Pascal and CP/M.

For local availability and pricing, contact AST Research, 2121 Alton Avenue, Irvine, California 92714, telephone (714) 476-3866.

Circle No. 39 on Reader Service Card.





● Designed to run under the new Apple ProDOS, the **Medical Office Management** IIP system can manage a practice of up to ten doctors and ten thousand patients. Offering such features as mouse selection and editing, and hard disk compatibility, the package provides a complete accounts receivable system, a claim form preparation system, a patient database, text editor, a financial history system and an appointment scheduler.

Supported by a twenty-four hour hotline, the system retails in the States for just under two thousand dollars, and is available from *CMA Micro Computer*, 55722 Santa Fe Trail, Yucca Valley, California 92284, telephone (619) 395-9718.

● *Apple* recently introduced the **Macintosh Plus**, offering users increased speed, memory, storage and expandability. Providing one megabyte of internal memory, and eight hundred kilogbytes of disk storage, the Mac Plus includes a new keyboard with a numeric keypad and cursor control directional arrows, and an SCSI port for expansion. Owners of Macintoshes 128K and 512K can add all of the Mac Plus peripherals to their own systems using upgrade kits.

With a suggested retail price of $4,195.00, the Macintosh Plus is available through authorized Apple dealers.

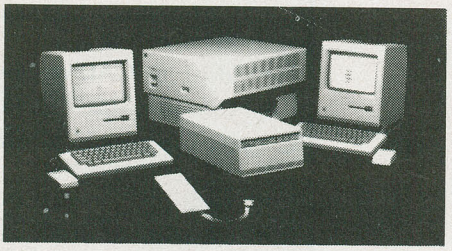
Circle No. 40 on Reader Service Card.

Net Works

● Providing an alternative to Apple's AppleTalk Network, the **Macintosh Omninet Network Interface** from *Corvus Canada* enables Macintosh 512K users to connect to Omninet along with IBM PCs, ATs and compatibles and Apple IIes. Used in conjunction with Corvus' disk management network software, the Interface attaches to the modem port of the Mac, and retails for just under six hundred dollars per station.

Corvus Canada's address is 250 West Beaver Creek Road, Unit 17, Richmond Hill, Ontario L4B 1C7.

Circle No. 41 on Reader Service Card.



● From *Torus Systems* comes Tapestry, a full-featured IBM compatible **office automation networking** program. Tapestry provides a shell program over the IBM's PC DOS, enabling users to switch among any applications on the network, and can network up top seventy two workstations.

For pricing, and the availability of a French language version, contact PCanada Systems, 265 Nantucket Boulevard, Scarborough, Ontario M1P 2P2, telephone (416) 751-3221. **Circle No. 42 on Reader Service Card.**

Taking Pictures

● *Micron Technology* has recently introduced the Idetix, a low cost **digital imaging camera** for use with the IBM PC, XT and AT. The demo program and Assembly language Driver Library with image enhancement routines allow the Idetix to be tailored to specific individual applications.

Listing for just under seven hundred dollars American, the Idetix is distributed by Micron Technology, Vision Systems Group, 2805 East Columbia Road, Boise, Idaho 83706, telephone (208) 383-4000.

Circle No. 43 on Reader Service Card.

● A **slide system** for in-house production of 35mm slides and overhead transparencies, the PC-Slide System, is now available from *Management Graphics*. Consisting of PC-Slide software and the Imapro QCR/D4 and PCR camera, the System includes a form driven graphics package for charts and a draw program for the generation of images such as maps and logos. Additional features include the Queue Manager for unattended imaging, programmable font sizes, polygon scaling and copying, custom colour palettes of up to 255 colours per image, and an image library of symbols and maps.

The System retails for under twenty thousand dollars, and requires an IBM PC, XT or AT with graphics board and monitor. For further information, contact Management Graphics, 2064 Avenue Road, Toronto, Ontario M5M 4A6, telephone (416) 485-2855.

Circle No. 44 on Reader Service Card.

Cheap Talk

● A new word processing package for the **IBM PC**, WPro, was recently introduced by *Natural Language*. Running under both DOS and QNX, WPro can combine text with images generated by most of the paint or business graphics packages available for the PC, and provides overlapping windows and horizontal scrolling up to two hundred columns wide. Including such features as built-in form manager, mail merge, label printing, concurrent print spooling, WPro was designed to run in single user systems or local area networks, with or without hard disks.

Retailing for $110.00, WPro is available from Natural Language, P.O. Box 13467, Kanata, Ontario K2K 1X6, telephone (613) 820-8299. **Circle No. 45 on Reader Service Card.**

● For the **Apple II family**, MasterType's Writer is a new word processor which includes such features as dual windows for outlining, colour highlighting, multiple typefaces, macro commands and an on-disk tutorial.

MasterType's Writer is available for $44.95 US from Scarborough Systems, 55 South Broadway, Tarrytown, New York 10591, telephone (914) 332-4545.

Circle No. 46 on Reader Service Card.

COMPUTER PRESS

continued on page 90

Interfacing

The **Dual Serial Port Manager** (DSPM) from *Akron* provides an interface between an applications program and the serial ports of an IBM PC, XT or AT and compatibles. Similar to a DOS device driver, the DSPM is a hardware/software interface to programs written in Pascal, C, compiled or interpreted BASIC, Fortran and Assembly Language.

Costing $135.00, the DSPM is available from Akron Software Research and Development, 53 Hillside Avenue, Toronto, Ontario M8V 1S7, telephone (416) 251-1866.

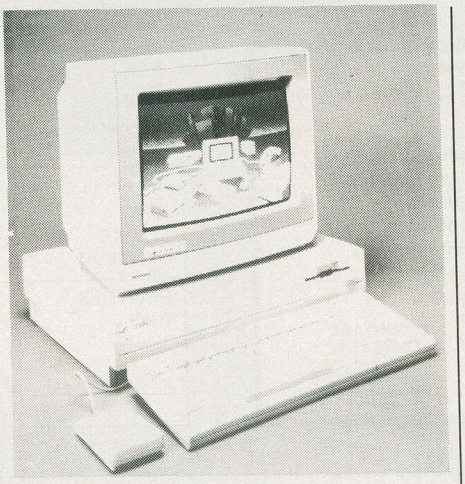
Circle No. 47 on Reader Service Card.

Fontastic Printing

A new **printer operating program** has been introduced by *Koch Software Industries* for the Hewlett-Packard LaserJet series. Designed to run on the IBM PC, XT, AT and compatibles, Fontastic also supports the Canon LBP-8 A1 printer, IBM Graphics printers and compatibles, is compatible with both monochrome and colour monitors, and supports EtherNet's 3COM network.

Fontastic macros can be embedded in such software programs as Lotus 1-2-3, SuperCalc3 and WordStar.

Including telephone and newsletter user support, Fontastic retails for $125.00 and is distributed in Canada by Data-Ray Computer Products, 7170 Warden Avenue, Unit #4, Markham, Ontario L3R 5M8, telephone (416) 477-8460. **Circle No. 48 on Reader Service Card.**



Amiga Goodies

Lattice Incorporated has recently introduced several products specificaliy for the Commodore Amiga.

For programmers, dBC III Library contains over seventy C functions which are **compatible with dBASE III**, and lists for $247.00, while the **MacLibrary for the Amiga** is functionally compatible with most Macintosh Quickdraw routines, Standard File Package and Toolbox Utility routines; call for pricing.

Amiga users can get telephone support for UNICALC, an **electronic spreadsheet** which makes full use of the Amiga's speed and power. With a list price of $115.00, UNICALC is compatible with other popular spreadsheets such as Lotus 1-2-3 and SuperCalc.

Lattice products are distributed in Canada by Software Commodities, 334 King Street East, Toronto, Ontario M5A 1K8, telephone (416) 865-1600.

Circle No. 49 on Reader Service Card.

More Lattice Work

- The *Lattice* **Screen Editor**, designed specifically for programmers, is a flexible multi-window editor providing such features as Lattice C error tracking mode, three assembly language input modes, and pattern searches. the Screen Editor is available for the Amiga with a list price of $145.00, and for MS-DOS machines for $179.00.

Circle No. 50 on Reader Service Card.

- The *Lattice* **C Compiler** has been enhanced to version 3.0, and features more efficient code generation, support for the 80186/80286 instruction set and the ability to generate in-line 8087/80287 instructions. The Version 3.0 library contains more than 325 functions providing compatibility with UNIX, XENIX and ANSI plus extensive support for MS-DOS Versions 2 and 3.

Listing for $692.00, updates are available for users of earlier versions. **CN!**

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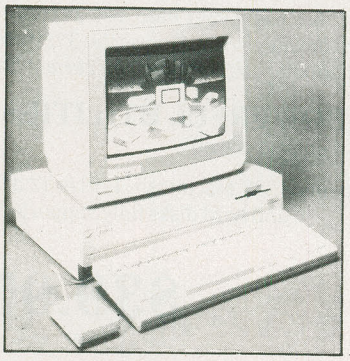

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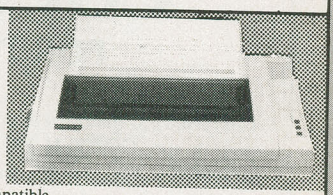
ADMATE DP-140/DP-150/DP-180

Wide Carriage Dot Matrix Printer

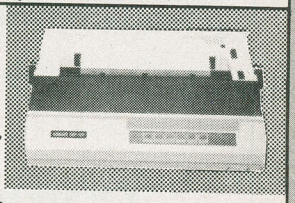


FEATURES

- 136 columns
- Both friction and adjustable sprocket feeds as standard fitting
- Logic seeking for faster throughput. Many other features are available so please contact us for more details.
- DP-140 136 columns 130cps
- DP-150 136 columns 130cps *IBM compatible
- DP-180 136 columns 180 cps

*IBM is a registered trademark of International Business Machine Corp.

ADMATE DSY-120 — Daisy Wheel Printer



FEATURES

- Printing speed - 18 cps (Repeat), 16 cps (Shannon Text)
- Printing System - 96 spokes daisy wheel (Qume compatible)
- Character pitch - 1/10'', 1/12'' and 1/15''
- Print length - 12'' (305mm)
- Nos. of character per line - 120 at 1/10'', 144 at 1/12'', 166 character at 1/15'' pitch
- Platen lenght - 15''
- Interface - Parallel as standard and RS-232C as option

*Qume is the registered trademark of QUME Corporation

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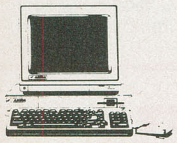

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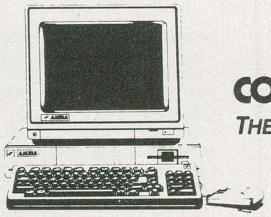

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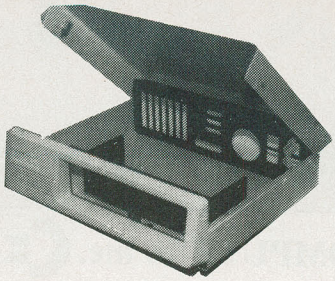
CLEARANCE, BACK SWITCH CASE **$59.95**

We also have an IBM 8 Slot/6502 Board dual duty case for making IBM look-a-like 6502 systems $79.95



NICADS 8.4V 7 "D" 4A.H CELLS

A great buy, a pack of 7 brand new GE NICADS giving 8.4v at 4 Amp hours. Each cell is 12v and separates easy. Used as 5V backup through a 7805. Gives 5v 1 Amp for 4 hours. **$14.95**

WIRED CARDS FOR IBM

(A) 384K RAM CARD. A ¾ sized card that has 384K of 64K DRAM on board. With OK **$79.95**

(B) 512K RAM CARD. A full sized card with 512K of 64K DRAM on board. With 64K **$119.00**

(C) 576K RAM CARD. A very popular card with 576K of 64K and 256K DRAM on board. This is a ¼ sized card for portable use. With OK ..... **$ 79.95**

(D) KRAM RAM CARD. A clone of the JRAM with up to 2 MBYTE on board using 256K DRAM. 100% compatible, complete with software for using as RAMDISC and RAMSPOLL. With OK **$139.00**

(E) COLOR GRAPHICS. A clone of the popular PERSYST color card. Has three outputs and one input. A. RGB for IBM color monitor. B Video 1v P to P composite color video. C. Video gray scale 1v P to P for seeing color on green or amber monitor **$129.95**

(F) MONOCHROME GRAPHICS/PRINTER. A workalike clone 100% IBM compatible for the HERCULES card. Has par printer port and hi-res text and graphics mono output **$159.95**

(G) 384K HEXPACK. A copy of the AST 6-PACK, 100% compatible with software. Has Clock/calendar/alarm and 384K DRAM and serial and parallel ports and game I/O. With OK **$189.00**

(H) 640K HEXPACK. Similar to above but with 640K on board using 256K and 64K DRAM. All other features the same. With OK **$279.00**

(I) DISC CONTROLLER. For 1-4 DS-DD drives. Full IBM standard with cable and instructions. ..... **$ 79.95**

(J) DISK CONTROLLER + I/O CARD. A very good card that has a clock/calendar/alarm and game I/O and serial and parallel ports and a standard 1-2 drive controller card on a full sized card. Very efficient card **$189.95**

(K) I/O + 2. A clone of the very popular USA card of the same name. Has clock/calendar/alarm, with game I/O, serial and parallel, ports **$129.95**

(L) PRINTER CARD. A standard centronics printer port for all parallel printers ..... **$ 59.95**

(M) SERIAL CARD. A standard ASYNC serial card for modem use etc. ..... **$ 49.95**

(N) MODEM CARD. A 300/1200 Baud modem using the 8910 WORLD chip. Compatible with many popular software packages. **$189.00**

(O) 8255 I/O CARD. Uses 2 8255's to give 16 lines of I/O for various uses. Fully locatable **$129.95**

(P) CLOCK CALENDAR CARD. A small card to add the clock/calendar/alarm battery to system ..... **$ 49.94**

(Q) GAME PORT CARD. Adds two std game I/O ports to the system ..... **$ 39.95**

SYSTEMS

All SME-XT systems share these attributes.

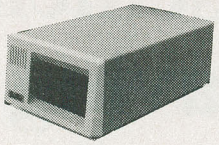
- High order compatibility due to the DTC bios which is recognized superior to others.
- 8 Slots for plug in cards, just like IBM
- Made right here in Canada
- Socketed for the 8087 Co-processor
- IBM compatible serial keyboard
- Disc controller using 9216 IC, the most advanced, for error free operation.
- Properly made 135W power supply with accessory plugs.

(A) Basic system 256K, 1 DSDD drive, & controller monochrom[e] card, 135W PS and keyboard **$949.00**

OPTIONS, Add the amount indicated for the option.

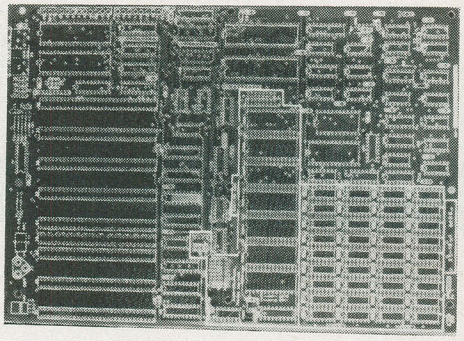
(1) 640K Motherboard with 640K **$110.00**
(2) Color graphics card with gray scale ... **$ 80.00**
(3) Parallel printer port card **59.00**
(4) Clock, calendar, alarm, serial, parallel, and game card **$110.00**
(5) Extra drive, installed and tested **$160.00**
(6) 10 Meg hard drive, w/controller **$699.00**
20 Meg hard drive, w/controller **$949.00**
(7) IRWIN 10 meg tape B/U **$649.00**
IRWIN 20 meg tape B/U **$799.00**
Tape cartridges for above ..... **$ 34.95**
(8) External hard drive box w/power supply for hard drive or tape B/U option, w/cables and ready to go **$249.00**

HARD DRIVE BOX



This nicely made box is ideal for externally mounted hard or floppy drives. It has space for one full height or two half height drives and power supply space at rear. This is a well made and rugged units for only **$59.95**

NEW SME-XT 640K TO 1M BYTE



In response to popular demand we have developed an upgrade of the famous MBE-XT board. The new board is called the SME-XT and has space for up to 1 Mbyte on board. The most popular configuration is 640K which is the IBM max addressable memory. The extra RAM above 640K is normally used for system purposes such as video lookup, ROM sitting, and other uses. However, we can supply proms to allow full use of this overhead space on demand. The 256K RAMS are more highly evolved than 64K RAMS and board using them have far fewer problems with parity errors. We have decided to maintain the low-low price we pioneered with the MBE-XT and sell the new PCB at $39.95 as well. All other attributes stay the same as the original IBM and the MBE-XT.

SME-XT **$39.95**
Manual and Schematic ..... **$ 4.95**

LAZY BOARD

LAZYBOARD. No we are not lazy, it's for YOU!!!. We had a bunch of 640K motherboards expertly wave soldered with all solder-in parts with AMP style IC sockets but no IC's at all. You buy the IC's or use your own stock and you can get a system going really cheaply. We are selling this "LAZY BOARD" for only **$135.00**

QUME

Yes we have the same QUME drives that IBM uses in their IBM-XT® system, 40 track, 1/2 height, double sided, double density. The exact ones you need to upgrade your old system or build your clone system up to the max. These are brand new drives that are from QUME's own inventory. They are absolutely perfect, at a perfect price of only **$149.00**

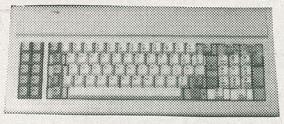
MEMORY FLASH

64K-200Ns DRAM **$2.00**
64K-150Ns DRAM **$2.00**
256K-150Ns DRAM **$5.75**
Set of 941256 ..... **$44.00**

CABLES

Disc Drive cable (3 Con & twist) **$12.95**
IBM Parallel printer cable **$14.95**
IBM serial printer cable **$14.95**
IBM 6' Keyboard extension (curly) ..... **$ 9.95**

KEYTRONICS 5150



Yes the famous KEYTRONICS 5150 IBM® compatible keyboard. MADE IN USA. We bought a bunch and can sell them for only **$129.00**

We also have some Taiwan copies that are quite good and all are checked for only **$109.00**

And lastly we have some Taiwan copies of the famous KEYTRONICS 5151 keyboard with all the same enhanced features for only **$139.00**

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110V, 60Hz with Fan and two rear switched outlets

These power supplies fit our cases.
130 WATT + 5V – 14A; + 12v – 4.2A; ± 12V – 1/2A

Back Switch **$135.00**
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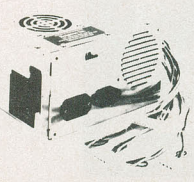
CSA Approved 150W Side Switch P/S **$159.95**



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DISC DOUBLER

Just that, it doubles your discs by cutting another write protect notch on the other side of the Apple SSDD diskette so the other side can be used, doubling your storage space. Note, almost all diskettes are good on both sides and the diskette packagers just lable them SS or DS and sell the DS for 25% more. So spend $8.95 and save hundreds later on.

MODULATOR

This modulator was made for the TI 99-44 that is now dead as a doornail. We bought a bunch and are selling em for... $14.95. They are a very good quality modulator for use on 12 Volts DC and have both sound and video inputs and are for color use on channel 3 or 4. They also have a built in antenna switch. They are a very good unit professionally built $14.95
Video cable, RCA-RCA 6 feet $1.00

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DB-25 M solder	$1.95
DB-25 F solder	$1.95
DB-25 M IDC, Flat cable	$5.95
DB-25 F IDC, Flat cable	$5.95
DB-25 M Right angle PCB	$4.95
DB-25 F Right angle PCB	$4.95
DB-25 Shell	$1.00
DB-15 M solder	$1.35
DB-15 F solder	$1.35
DB-15 F IDC, flat cable	$3.95
DB-15 M right angle PCB	$2.95
DB-15 F right angle PCB	$2.95
DB-15 Shell	$1.00
DB-9 M solder	$1.35
DB-9 F solder	$1.35
DB-9 M right-angle PCB	$2.50
DB-9 F right angle PCB	$2.50
DB-9 Shell	$0.75

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(A) 1400 WATT AUTOTRANSFORMER. Has taps for 120-220-230-240 Volt operation and is 100% new in the box. Cost Xerox over $150.00 in large lots, your cost only $49.95

(B) 240 WATT 120/240. This beauty has two 120 Volt primaries and two 120 Volt secondaries and can step up/step down with isolation. Each side is good for 2 Amp at 120 or 1 Amp at 240 Volts. Your cost $24.95

NOTE, due to the weight freight is extra, ask for $.

FLAT CABLE DRIVE CONNECTORS

50 Pin Edge C, 8" drive	$5.95
40 Pin Edge C,	$4.95
34 Pin Edge C, 5-1/4" drive	$5.95
20 Pin Edge C, Hard drive	$4.95
34 Pin Fem header 17 x 2	$3.50
26 Pin Fem header 13 x 2	$3.00
20 Pin Fem header 10 x 2	$2.00
16 Pin Fem header 8 x 2	$2.00
16 Pin DIP header	$2.00
10 Pin Fem header 5 x 2	$1.00

CENTRONICS CONNECTORS

36 Pin solder cable male	$6.95
36 Pin Flat cable make IDC	$6.95
36 Pin Chassis female	$6.95
S-100 Edge Connectors	$2.50

ASCII KEYBOARD

This is a high quality Hall Effect keyboard made by Microswitch of Canada for AES data and now bought by us for 10% of the $169.00 that AES paid for them in 10,000 lots. They are a very good word processing keyboard with both serial and parallel data outputs for use with APPLE and IBM type systems and come complete with a ribbon cable connector and complete pinout. $24.95

IBM POWER SUPPLY

One of the nicest open frame IBM type switching power supplies we have ever seen. Came from the defunct NCR IBM compatible. runs the whole thing, has +5V-7A, +12V-3A, -5, -12-¼A. A very good unit for starter system. Will not run hard disc system. A real Steal at $49.95

TEACHERS

We accept all SCHOOL BOARD purchase orders. We will provide a written quote if needed. We have access to all monitors, printers, disc drives, software etc. now sold in Canada and can quote very competitively on these items. Pls include any duty or sales tax data on any RFQ.

INSTRUCTIONAL USE BONUS

Any order for 12 units at regular price will be given an extra unit for instructional use. Larger orders will be pro-rated accordingly. Instructor may specify alternate goods for equal value. Pls invoke this bonus in writing at time of order referencing PO # in letter.

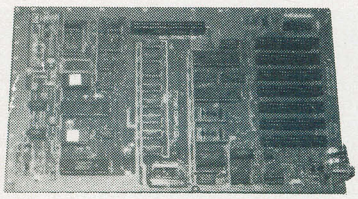
SPECIAL
10 MEG HALF HEIGHT HARD DRIVE W/CONTROLLER AND CABLES
$695.00

25 MEG HALF HEIGHT HARD DRIVE W/CONTROLLER AND CABLES
$949.00

PARTS,

8088 CPU	$12.95
8087 Math Processor	$219.00
8237A-5 Prog. DMA Cntrl.	$8.95
8250 Serial Port	$9.95
8253A-5 Prog. Interval timer	$5.95
8255A-5 P.I.A.	$4.95
8259A Prog. Interrupt Cntrl.	$4.95
8284A ADC clock gen & driver	$5.95
8288 Bus Controller	$9.95
8272 Floppy Disk Controller	$9.95
NEC 765 Floppy Disk Controller (equivalent to 8272)	$9.95
Set of 8088, 8255A-5, 8237A-5, 8288 8284, 8253A-5 and 8259A	$44.00
6502 CPU	$ 5.50
6845 CRT controller	$ 9.50
68A45 CRT controller	$ 9.95
Z80A CPU (4 MHz)	$ 4.99
MC3242	$11.95
74LS367	$ .62
74LS259	$ 1.39
74LS161	$ .99
74S74	$ .82
74S174	$ 1.70
74LS323	$ 4.55
Card edge connector (50 pin)	$ 2.49
RCA jack PC mount	$ .69
6 pin power square connector	$ .99
Phono jack (small)	$ .99
MPSA 13 trans	$ .55
2N3904 trans	$ .19
2N3906 trans	$ .27
MPSU51 trans	$ .79
2N4258 transistor or equiv	$ .69
1K SIP 10 pin	$ .69
1K SIP 8 pin	$ .69
10K SIP 10 pin	$ .75
4 pos dip sw	$ .95
20 pin female header for disk drive	$ 1.79
20 pin male	$ 1.69
50 pf trim cap	$ .89
220 ohm trimpot	$ .69
20 conductor ribbon cable	$ .89/ft.

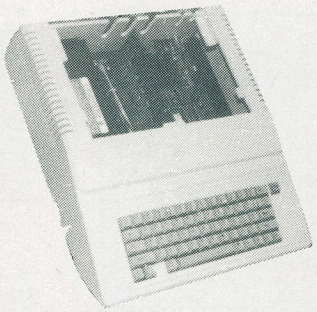
MOTHER BOARD



100% IIe* Compatible, for those of you who wish to build a clone of the very popular APPLE IIe* . This board is a reverse engineered copy of the IIe* and is 100% compatible. We have the motherboard and the custom ICs only. All other parts are widely sold. The custom ICs are workalike chips that do not infringe any copyrights. The software for operating the board must be obtained elsewhere as we do not have it for sale. When we say 100% we mean it.

A very good buy at	$49.95
Custom IC set(2)	$49.95
Keyboard encoder (AY3-3600)	$14.95
Character generator, U/LC	$14.95
48K 6502 Motherboard, same old 100% compatible 2 + clone	$29.95

IIe® ABS PLASTIC CASE
$59.95



This case is made to fit the Mother Board listed here for making IIe* clones and it makes a very nice looking copy. There is just enough difference to avoid design infringement. The case also has no brand names or other marks on it.

A good buy at	$59.95
ABS numeric case for 48K motherboard. Exact fit.	$49.95

PARTS,

100ns delay line	$5.00
7ns delay line	$13.95
62 pin edge con (high quality)	$1.89
5 pin Din conn	$1.25
Power conn	$1.25
Dip switch 8 pos	$2.49
4.7k x 6 sip	$ .69
4.7k x 8 pin sip	$ .69
8.2k or 10k 16 pin Resistor or net	$ .99
33ohm x 8 network	$1.10
Small speaker	$1.99
.1 uf 50V high quality bypass capacitors	$ .10
Trimcap	$ .99
34 pin card edge con.	$5.95
2716	$3.49
2732	$3.95
2764	$4.95

GRAY SCALE ADAPTER

As you know the IBM color graphics card does not look very good on a monochrome monitor. This is because often two colors look the same on monochrome so you cannot read red print on a blue background or some such. This little gray scale proportionately scales each color into a different intensity allowing easy viewing on amber, green or white monitors. We sell it as a kit for only (with cable) $19.95
or wired and tested (with cable) $24.95

SOCKETS AMP IC SOCKETS

As you know AMP makes the best IC sockets. With a double wipe action and a very wide open target for easy insertion, the best.

6, 8, 14, 16, 18, 20, 24, 28. 40
Pin in stock at only
1.5¢ PER PIN

APPLE IIe®
DETACHED NUMERIC KEYBOARD
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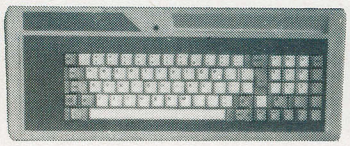

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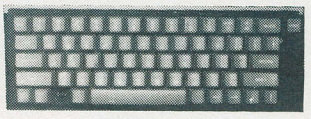

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Hard Copy

by Marie Hubbs

continued from page 85

General

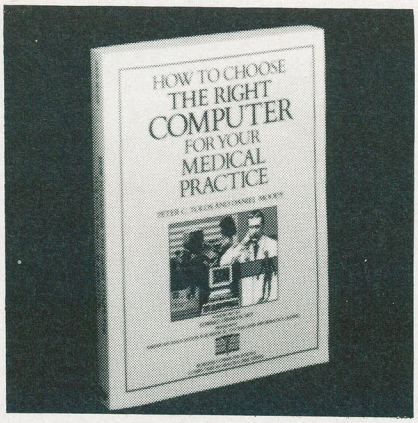
● *Business Data Communications* by David Alan Stamper provides technical aspects, broad coverage and **managerial issues** in data communications, and includes information on such topics as international standards and usage, hardware components, transmission facilities, networks of systems, software and design considerations.

Published by Benjamin/Cummings Publication, this book is distributed in Canada by Addison-Wesley, for a price of $40.50.

● Published by Benjamin/Cummings, *Discrete Mathematics with Computer Science Applications* by Skvarcius and Robinson provides students with a **set of tools for problem solving** in computer science, covering for example, modeling with calculus and continuous mathematics, expert systems, relational databases, coding theory and circuit design.

Available from Addison-Wesley, this self-instructional textbook retails for $40.50.

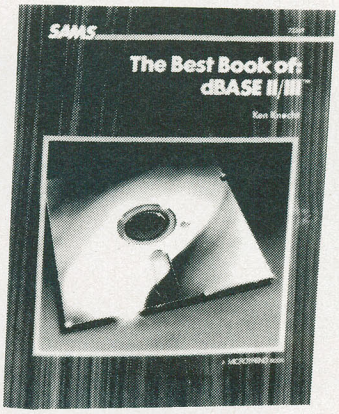
● *How to Choose the Right Computer for your Medical Practice* by Peter C. Tolos and Daniel Moody is available from Burgess Communications. Including a guide to the evaluation, selection and installation of a suitable computer, the book also covers negotiations with vendors, consultants and packagers of equipment, and costs $29.95 US plus $2.00 postage and handling.



Software

● From Sams comes another in their Best Book series: *The Best Book of: DBASE II/III* by Ken Knecht. Intended for **first-time dBASE users**, the similarities, differences, advantages and disadvantages of II and III are covered, as well as a tutorial on the use of dBASE II.

For pricing, contact Sams directly, or check with your local bookstore.



● *TURBO Pascal Tricks and Tips* from Abacus Software is a collection of **programming techniques** to be used with the TURBO Pascal compiler, and includes such topics as sort routines, binary trees, MS-DOS screen output routines, easy input function and screen mask generator for MS-DOS and CP/M-80, disk management procedures and a tracer utility for debugging.

Retailing for $19.95 American, the book is available directly from Abacus Software.

● *Pascal: Structure and Style* by Richard Lamb, is an introduction to **problem solving in Pascal**, and covers such topics as hints for BASIC programmers, writing large programs, programming examples, algorithmic development and programming style.

Costing $32.50 it's available in Canada from Addison-Wesley.

Hardware

● A guide by Gene B. Williams covering the workings, systems and components of all **Kaypro computers** includes service procedures, preventative maintenance, add-on installation and safety precautions. Published by the Chilton Book Company, the *Kaypro Repair and Maintenance* retails for $12.50 US in most bookstores, or can be ordered directly for a handling charge of $1.75.

Publishers

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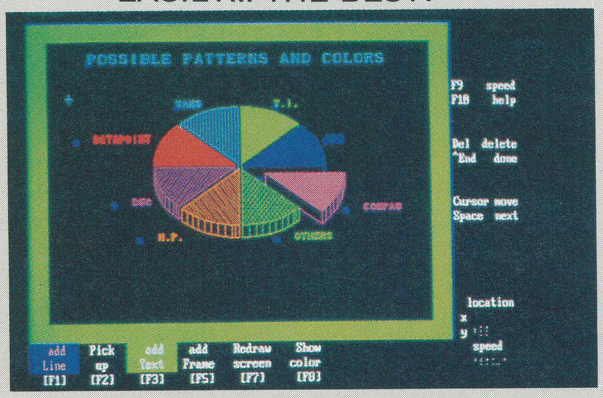

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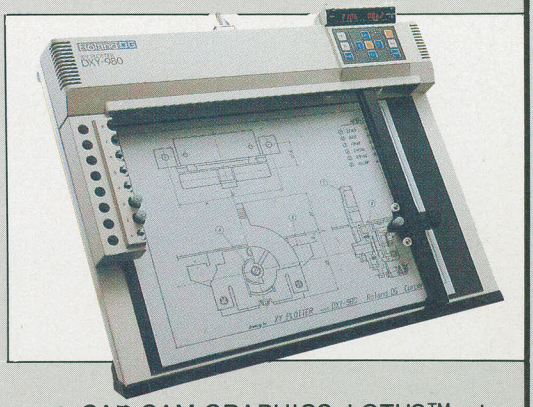

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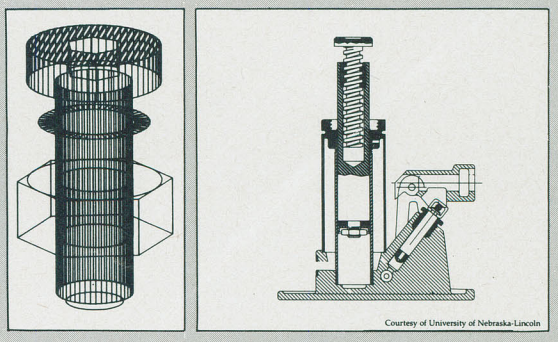

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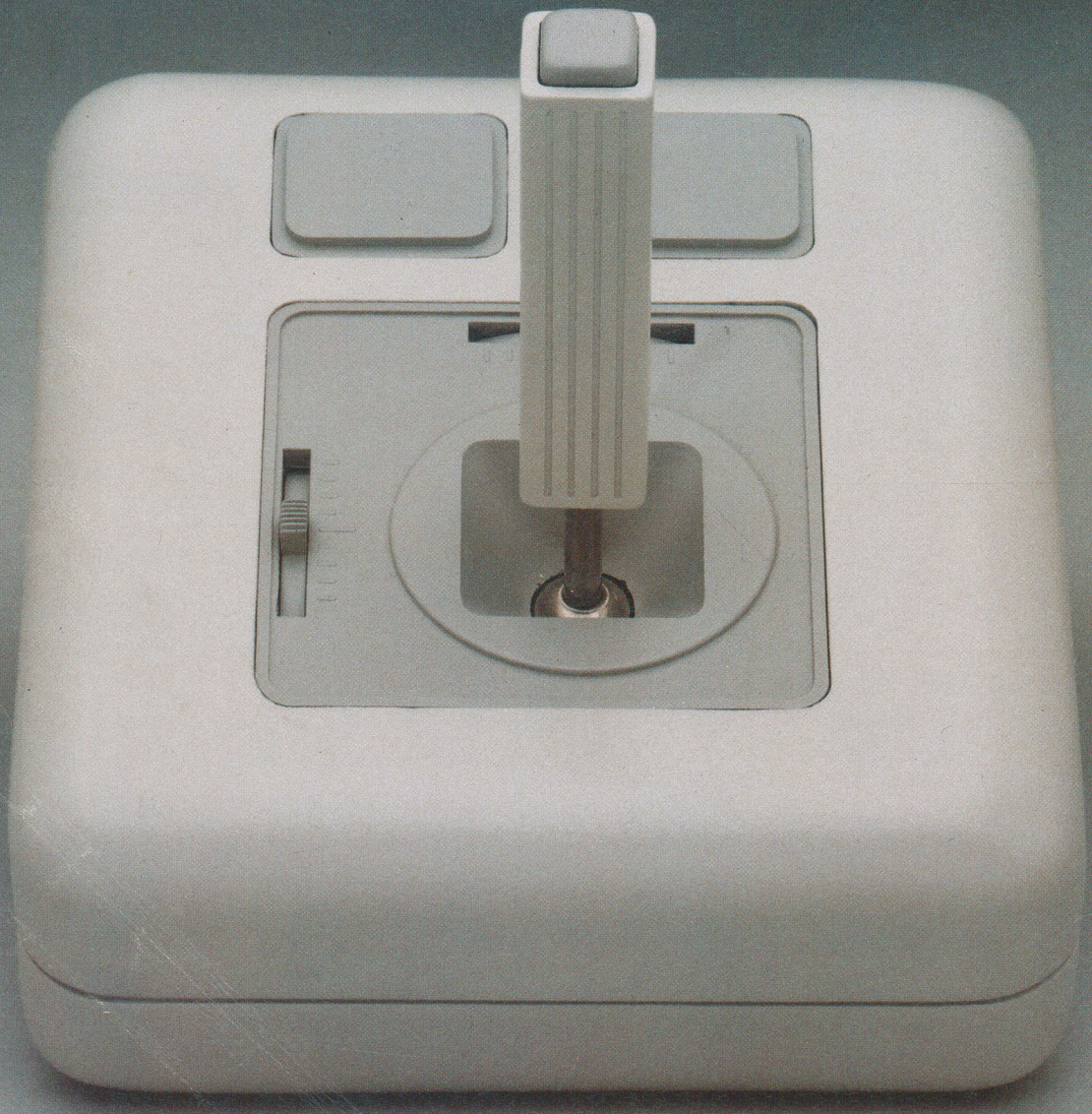

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